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Editorial Notes

Gasification of Coal and Coke

IN our issue last week, discussing in general terms the Autumn Research Meeting of The Institution of Gas Engineers, we referred to the growing appreciation of the need for correlating and co-ordinating research work, and we expressed gratification with the growing collaboration between the Institution and the Fuel Research Board. In the direction of methane synthesis, for example—an outstanding example—the possibilities of such co-operation are very great indeed; and it was a sign of the new outlook that at the same meeting that Dr. F. J. Dent presented the results of work on the hydrogenation of coal and coke Dr. J. G. King should give a Progress Report of experiments at the Fuel Research Station on the complete gasification of coal and methane synthesis. While the Institution is devoting its attention to the synthesis of methane under pressure during the carbonizing process, the Fuel Research Board is more concerned with the production of methane at ordinary pressures and in the presence of a catalyst, but there is no doubt that greater progress will be made in developing the Leeds technique on a larger scale in co-operation with the F.R.B.

The laboratory investigation at Leeds has been exceedingly fruitful, and the results point to the desirability of accelerating the work by strengthening the personnel engaged on it and spending much more money on it. The ease with which coals and cokes can be hydrogenated under pressure has been so amply demonstrated. Coals, after a preliminary carbonization at 450°-500° C., gave on hydrogenation at 900° C. yields between 500 and 600 therms per ton in gaseous hydrocarbons while the calorific value of the outgoing gases remained above 500 B.Th.U. per ton. Cokes prepared at 800° C. gave 520 therms. In this expression of therms per ton, of course, the amount of fuel required to produce the necessary hydrogen should be taken into account. One does not get twice as many therms from a ton of coal as are contained in that ton. On similar lines, taking into account the amount of coal employed in the process of hydrogenating coal into oil, a ton of coal yields only about 60 gallons of petrol.

Rate of Gas Production

THE report of the work at Leeds showed how the rate of gasification of fuels in hydrogen is accelerated by the presence of alkalis, how the addition of sodium carbonate increases the ability of coke to withstand heat treatment without losing its activity towards hydrogen, and how the admixture of alkalis considerably reduces the caking of coals. This rate of hydrocarbon production is of extraordinary interest. As an example, heating coal at 12° C. per minute and supplying hydrogen equivalent to 58,000 cu.ft. per hour per ton gave the first 200 therms of hydrocarbons per ton at an average rate of 220 therms per hour, corresponding on dilution to gas of 500 B.Th.U. per cu.ft. with a rate of gas production of 415 therms per hour per ton. "The output secured from the laboratory apparatus," stated the report, "cannot be compared directly with that obtained by normal large-scale carbonization—namely, approximately 7 therms per hour per ton, but the difference between the two is so wide as to be significant." And the first 200 therms in hydrocarbons per ton are ample for enrichment purposes in a process in which the residue from hydrogenation is used for hydrogen production. We would call attention, too, to the section of the report dealing with heat of reaction. Dr. Dent could not measure the amount of heat evolved by the reactions, but he does postulate that it will be sufficient in large-scale operation to maintain the reaction temperature once the reaction is started.

Ancillary Advantages

AFTER the completion of three years' work only on this new technique in the processing of coal one must be impressed with the remarkable success met with in the laboratory. There are so many fascinating aspects and possibilities of the gasification of coal in hydrogen under pressure. Some of these were touched upon by Mr. J. E. Davis in the course of the discussion on the report. Mr. Davis, in a valuable contribution, outlined some of the results of experiments carried

out, on similar lines to those at Leeds, in the Central Laboratory of the South Metropolitan Gas Company—experiments which have revealed facts of considerable potential importance. He explained that the use of coking coal does not appear to give rise to troubles, and that the yield of tar can be controlled within wide limits by choice of the conditions. A high proportion of the nitrogen in coal is converted to ammonia, and this should be obtainable at a concentration in the liquor which would make its recovery quite a different commercial proposition from the treatment of ordinary gas liquor. Difficulties due to the presence in ordinary coal gas of hydrogen cyanide and naphthalene do not arise. Then, we are naturally highly interested in the way in which sulphur behaves. The South Metropolitan Gas Company has found that an unusually high proportion of the sulphur in the coal is eliminated in the gas, leaving a coke of particularly low sulphur content—and the coke, by the way, is exceedingly reactive. Of great significance is the fact that substantially all the sulphur in the gas is present in the form of hydrogen sulphide, and after removal of this impurity there remains considerably less than 1 grain of organic sulphur compounds per 100 cu.ft. of gas.

The possibilities of the hydrogenation of coals and cokes are fascinating, and the time has come for a larger experimental unit. High pressure and catalysis technique, remarked Mr. Rhead during the discussion on the report, has such alluring attractions that it will withstand the many disappointments which are bound to come before commercial success is achieved; and we cannot afford to allow others to get into the field before us. It must be remembered, however, that in the first place the process demands the production of hydrogen, and it is not easy to make hydrogen cheaply.

Way to the Cheap Therm

WHATEVER the development of the hydrogenation of coal to produce methane, a gas with wonderful combustion characteristics, the fact remains that the manufacture of the cheapest therm of gas to-day depends on the successful marketing of coke; and it was appropriate that at the Institution meeting two of the Papers presented should be concerned with the production and use of solid smokeless fuel. That by Mr. James Jamieson and Dr. J. G. King was another illustration of the benefit accruing from collaboration of the Industry with the Fuel Research Board. It was concerned with the production of free-burning coke in continuous vertical retorts, and it demonstrated once again the wonderful asset the Gas Industry has in the flexibility of its carbonizing process. It was an admirable example, too, of the great value of the Fuel Research Coal Survey. A rough estimate of the total coal which has been surveyed up to the present is 30,000 million tons. For this work there are now 13 Committees and 9 laboratories, and the organization covers 98% of the coal being raised. In the work described by Mr. Jamieson and Dr. King the known reactivity of the coke made from weakly caking coals was utilized by making a careful choice from the Fuel Research survey records.

If there is proved to be a market for free-burning smokeless fuel, easily ignitable, then the Gas Industry should be prepared to supply this fuel. The Edinburgh work has shown how simple its manufacture can be in normal gas-works carbonizing plant. Selected coal, suitable as to size and coking index, was carbonized at a temperature about 200° C. lower than in ordinary gas making practice, under steaming conditions and at a high rate of throughput. The gas yield was reduced, but the solid smokeless fuel proved to be eminently satisfactory in the open firegrate. Naturally the coke would have to be sold at such a price as to balance the higher coal cost and allow of the production of gas at no increased cost. The Authors discussed the economic aspect of the problem and concluded that the preparation of a smokeless fuel on the lines they outlined could expand the market by providing an excellent substitute for special low-temperature cokes, and a substitute at a lower price. As for the gas produced in the process, this, with a calorific value of about 540 B.Th.U., would be valuable for enrichment purposes.

The Coke Grate

IT is good to know that the Gas Industry can produce without undue difficulty in existing carbonizing plants a coke as satisfactory as low-temperature coke for the ordinary open firegrate. Such a coke costs more than ordinary gas coke to produce, but there is no reason to suppose that a market for the product could not be cultivated, particularly in view of the growing public interest in smoke abatement. On the other hand, are we doing all possible to persuade the public to burn gas coke in special gas ignited grates? These grates could provide a solution to the problem of finding a permanent remunerative market for coke, and more attention should be focused on them. Gas coke, with its high efficiency of radiation, is the most efficient solid fuel for open fires, once the consumer has equipped himself to take advantage of this property. The better and the more stable the coke market, the lower the cost at which gas can be sold. We should make a grave mistake if we neglected the development of the coke market or relaxed efforts now on any promise which the future might hold for gas and gas alone. The economy of using coke in place of coal was demonstrated by the Institution Paper given by Dr. Davidson and Dr. Hartley. We should make the most of the low cost of heating with coke. The London and Counties Coke Association has indicated what can be done in popularizing the special grate for burning gas coke. There are about 250,000 of these grates in the London area—but this figure is a very large proportion of the total number of coke grates in the country. We should like to see a general and really enthusiastic sales drive for the coke grate.

The Gas Industry's Solution

IF we cannot for the moment enjoy an all-gas scheme, we could enjoy an era of gas and coke, to the nation's benefit. At the annual luncheon of the British Commercial Gas Association last month Mr. Herbert Morrison, leader of the London County Council, spoke of London's appalling waste due to smoke from the burning of raw coal. Every year in London about 240 tons of soot fall on every square mile. As a result London's smoke fogs have acquired an international reputation. It has been calculated that smoke costs the people of London between £1 and 30s. per head per annum—equivalent to a Council rate of 1s. 5d. in the £. They in London, he went on to say, could do a certain amount themselves, but they needed continually the practical assistance of the smokeless fuel industry as a whole. They were ready to listen and learn, and would meet half way an industry which could prove that smoke abolition in the ordinary household was fully practicable. He was sure that many other authorities would take the same view. And if some, local or national, were

apathetic or deaf, then his advice was: Tackle them, and tackle them resolutely. Insist on a chance to prove their case, and in the end they would have to listen. Why, though, is Mr. Morrison, or any others responsible for local government, waiting for the solution to the smoke evil when that solution already exists—undeniably an economic solution. The smoke problem can be solved by the complementary use of gas and coke. Proof is to be found at Kensal House, where the average expenditure on a complete gas and coke fuel service is 4s. 6d. a week, compared with a sum of over 6s. 6d. per week which the average London working-class family would have to spend on the crude raw coal methods. The Gas Industry can prove its case, and it must make local authorities listen.

The S.B.G.I. Address

It is the custom for the Chairman of the S.B.G.I. to address his fellow members annually at the Autumn General Meeting of the Society upon some subject that may be of interest to them. In consequence, our columns have from time to time been enriched by much that we should otherwise have missed, for the Society has been fortunate in its Chairmen. The gas engineer is the front-line soldier in the industrial struggle waged by the Industry; the members who comprise the S.B.G.I. are, however, little removed from that particular battle. While they have their own struggles which in many instances lie in other fields, in a greater or lesser degree they all depend upon the success of the Gas Industry for their own livelihood. This peculiar position means that they can bring to the counsels of the Industry experience in other fields, and a different viewpoint from that of the gas engineer. For these reasons the semi-detached views of some Chairmen of the Society bring fresh air into our counsels. There have been, of course, some of them who were wholly within the Industry, but probably not very many. One of the confessedly semi-detached is the present Chairman, Colonel Planck, whose Address appeared in our columns last week.

Colonel Planck gave us a comprehensive review of the problems of the Gas Industry, and clearly indicated that, though the S.B.G.I. may be semi-detached, its members take a very keen interest in the practical affairs of all phases of gas manufacture, distribution, and supply. The changes that have occurred within the lifetime of the Society, and which were reviewed in brief by Colonel Planck, are fundamental. How often is it realized that members of the contracting and appliance-making side of the Industry must keep a constant watch upon developments to be able to meet the coming needs of the gas engineer? These changes must at times have thrown no small strain upon the resources of those firms. Plant and manufacturing methods have been changed; personnel has been extended to embrace more specialists. The purely engineering firm of 40 years ago is rare except on the small scale, for the ubiquitous scientist has invaded even the workshops of the engineer. The gas engineer prides himself upon his new plant, his new standards, his research organization, and all the developments of the past few decades; how far does he realize that there has been a parallel development in his "munition department," and that without that parallel development the present state of the Gas Industry would be far less forward than it is? The members of the S.B.G.I. have performed their modernization quietly, but efficiently, and because as business men they have foreseen the necessity to keep abreast of the times.

Increasing Co-operation

Colonel Planck referred to the tendency in recent years for increasing co-operation between firms engaged in any specific industry whereby prices can be stabilized, work can be spread economically and in agreed proportions over the industry, and sometimes, where needful, a common research organization can be set up. Regarding the merits of price stabilization and agreements to distribute the work, gas engineers are commonly apt to be doubtful. Just how far either of these arrangements is operating among firms supplying the Gas Industry we do not know. Probably to a very small extent only. It is possible to argue, however, that under proper safeguards against profiteering these arrangements operate for good. It will generally be found that the bitterest opponents of these forms of industrial organization are those who desire to put firms in competition to obtain the lowest price. We all know the type of buyer who believes in the Dutch Auction. He is akin to the type of salesman who believes in selling at the highest price he can force the buyer to pay. Such methods may suit Eastern markets; they are out of place in the more straightforward business world of the West. They resemble, too, the gas "salesman" to whom Colonel Planck referred whose only objective is to sell a given appliance "with no thought of that great and dignified ideal of service which it is the ambition of all far-seeing leaders of the Industry to impress upon the public."

The fact is, of course, that the "munition side" of the Industry must be prosperous if the Industry itself is to retain its competitive power. Two thousand years ago it was laid down that the labourer was worthy of his hire, but today the "labourer" must have more than his bare hire; he must have the power to conduct research and development work and to keep his manufacturing plant up to date. An impoverished plant and appliance side would cripple the whole Industry. Gas engineers will, of course, take all reasonable precautions against the possibility—which is but slight when dealing with reputable firms—of being overcharged; but they must in their own interests guard against price cutting in any form. If the further organization of the engineering and similar firms that is foreshadowed in the light of modern industrial tendencies should result in competition between whole industries instead of between individual firms, we cannot think that the Gas Industry will be the worse off. Rather will it benefit because of the greater power for good of the industries concerned.

Wise Buying

Colonel Planck believes that if this form of co-operation increased, as seems to him likely, unregulated competition would disappear. If unregulated competition disappears, it may be that unregulated tendering will disappear, and that within the Gas Industry the purchasers may demand that work shall be done on a cost-per-cent. basis. That, however, is looking a good many years ahead. The moral to be drawn from this part of Colonel Planck's Address appears to be that it is in the best interests of all concerned that the Industry should continue to pay a fair price for its plant and appliances, such as will enable it to secure the highest class of work, and the best advice in its engineering problems.

There is more than meets the eye in Colonel Planck's suggestion that there is a lack of statistical information within the Industry. He calls for this information for the formulation of policy, for prestige advertising, for sales cam-

paigns, and the like. What appliances are in use throughout the country? What are the age limits of these appliances? How are these appliances distributed over the districts? One can imagine a host of questions that might be asked; would they all be capable of an answer? There is, of course, no power to obtain information if any undertaking did not give it willingly. One would, perhaps, like to ask many questions which individual undertakings have not the time or the power to answer. It might be useful if a committee sat down to draw up a comprehensive list of all the information that would be of real value. We believe that the American Gas Association can supply its members with far more information than is available in this country.

Mention of this suggestion—which we should much like to see elaborated by Colonel Planck or someone else who has definite ideas of what is required—reminds us of one type of research that the Industry appears to neglect. There were two, but engineering research has just been begun. The missing link is research on economics. Colonel Planck said that "to enable such statistics to be of the fullest use, they should be built upon the most detailed information available from and supplied by individual undertakings, and finally grouped in such a manner that a valuable market survey results. It might be possible to go a step further and to suggest that a qualified economist with experience in market research should be put in charge of the statistical department with general instructions to exercise his art upon the statistics he is permitted to collect. It seems clear that if this information were to be of the extensive character visualized by Colonel Planck, it would be of immense value from an economic point of view, and would help to guide the Industry (perhaps through an Economics Committee) in formulating sound policies. In any great industry economic research is to-day as important as chemical research or engineering research.

An Economics Department

COLONEL CARR (quoted by Colonel Planck) has pointed out that the gas consumption per consumer is nine times as great in the U.S.A. as in this country. Why? It is said to be due to the difference in the usage of industrial gas. Again we ask why? Perhaps a statistical and economics department would answer this question in a constructive manner. Hence we see that such a department would also be charged with the task of collecting statistics from abroad in case something of importance was discovered there which we might follow here. Mr. E. V. Evans in his Royal Society of Arts lecture enquired the reason of certain shortcomings of the Gas Industry, and gave as his answer that "in the matter of pricing policy the Gas Industry has failed to keep abreast of present-day needs." Is it not just here that a statistical-cum-economics department might be of immense assistance?

Colonel Planck made particular reference to the need for a strong all-gas house policy. Quite evidently such a policy would be in line with modern fashion and modern domestic tendencies. But because about 85% of the population (here we want the statistical department again to tell us the precise figure) earns less than £5 a week, fashion and tendencies must give place before economics. If we cannot with gas do the work of solid fuel at the price of solid fuel, we shall not be allowed to do it at all. Certain undertakings mentioned by Colonel Planck are doing this, possibly by reason of special advantages such as the use of coke-oven gas, and possibly through the discovery of the correct tariffs. The number of gas appliances that would be sold if such a policy became general would be enormous. This problem appears to be bound up with manufacturing cost, distribution cost, efficiency of gas appliances, and economics. It is complex, and we have some sympathy with Colonel Planck's plea that "this is not a problem which should be left to a few isolated engineers and managers, or appliance manufacturers, to experiment upon, but it should command the attention of a strong body within the Industry set up for the purpose of considering this vital problem and all that it entails."

When reading Colonel Planck's stimulating Address, it occurred to us to ask what machinery exists within Gas Industry House for collecting and bringing to the notice of the appropriate bodies the many interesting and useful suggestions that are published in the course of each year. It is a constant complaint among engineers that comparatively few new facts or ideas are contained in any one paper or article. Nevertheless, as we know from experience, it is in these publications that those who have anything to say say it. Too often, valuable ideas lie fallow in the vast heap of technical literature which piles up annually on the bookshelf of every engineer. Unless it is someone's business to collect and bring forward these ideas, they must die of inanition, so rapidly does one publication follow upon another.

A technical writer of experience has told us recently that he finds it generally useless to publish new facts or new ideas once, unless the place and time of publication be particularly happy. Each fact or idea must be published again and again, and hammered in till it becomes common-place before anyone takes an interest in it. In plain words, the innovator must set to work to popularize his ideas before they are taken up. There is yet more work for our statistical department—but we must stop or it will be overworked!

Colonel Planck is to be congratulated upon an Address in which he hit a great many nails on the head; perhaps his marksmanship in some directions has been even better than he anticipated. It is certain that many of the problems he has visualized are already receiving the close attention of the Industry.

The Gas Industry's Need

It was a very inspiring Address which Mr. Ralph Halkett gave to the Yorkshire Junior Gas Association recently. It is published in our issue to-day. Those ouside the Industry do not appreciate the opportunities for a useful career which the Gas Industry offers. A short time ago Sir Frederick West quoted the example of a university graduate who was made to feel that he was losing caste by entering the Industry. Such an idea is, of course, quite absurd, but there does seem a need for the personnel of the Industry to disabuse the idea. The Industry has need, as Mr. Halkett emphasized, of trained men of good social bearing. "By our appearance, our manner, and the service we offer," he said, "we can each create the atmosphere which nowadays is commercially so important, and then no young man need ever think he might lose caste by joining us." Mr. Halkett expressed the opinion that commercial training and the commercial outlook are essential to those who in the future will control the Industry's destinies. "We live in an age when powerful influences from other trades encourage the fickle public taste. Change is the order of the day. Whether we like it or not we are compelled to face it, and only an industry well equipped with mental agility can hope to keep in front." This is true. The Industry has need for men of good education and bearing, but, recognizing the need, it must at the same time be willing to remunerate its personnel accordingly. Otherwise it will certainly not attract the right type.

Personal

On Thursday afternoon an interesting ceremony took place at the offices of the Ramsbottom Gas Company, on which occasion Mr. FRED SHARPLES, Secretary of the Company, was presented on behalf of the employees with a grandmother clock to commemorate fifty years' service.

At the presentation Mr. R. Crowther, Engineer and Manager, occupied the chair, and Mr. Fenwick, Chairman of the Board of Directors, made a very interesting speech recalling many incidents during and even before that period of fifty years. Mr. Raymond Ogden also spoke in appreciative terms of associations with Mr. Sharples, after which Mr. Joseph Reofern, an employee of the Company, who has forty-five years of service to his credit, made the presentation.

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Mr. J. SANDON STUBBS, Secretary and Treasurer of the Liverpool Gas Company has been appointed to the Commission of Peace for the City of Liverpool.

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Mr. S. C. METZGAR, London Manager of Messrs. Gibbons (Dudley), Ltd., Dudley, Worcs., has been appointed a Director of that firm, and also of the associated Company, Messrs. Gibbons Bros., Ltd.

Obituary

Dr. J. O. V. Irminger

Dr. J. O. V. Irminger was born in Copenhagen on Aug. 17, 1848, and died there on Oct. 4, a few months after celebrating his ninetieth birthday.

Dr. Irminger was a graduate of the Royal Technical College of Copenhagen, and in 1874 joined the Staff of the Copenhagen Gas Department. From 1878 to 1914 he was the Engineer of the Eastern Gas-Works and from 1914 until his retirement in 1920, on reaching the age limit, was Chief Engineer of all the Works of the Department. In addition he was frequently consulted by other Undertakings regarding gas and other technical questions.

Dr. Irminger was widely known outside Denmark for his work in the Industry and read many Papers before different Institutions, including The Institution of Gas Engineers, of which he was a member until after his retirement.

He was also a distinguished worker in other scientific fields, particularly in aerodynamics, in which field he was a pioneer and carried out valuable investigations into the effect of wind pressure on building structures. He devoted himself especially to research in this direction and after his retirement and in 1936 he and Dr. Chr. Nokkentved published an elaborate monograph embodying the results of their further experiments entitled "Wind Pressure on Buildings, Experimental Researches, Second Series." In recognition of the great practical value of this Work the University of Copenhagen conferred the Degree of Doctor of Civil Engineering on Mr. Irminger.

Dr. Irminger was a man of keen and active imagination, strong personality, and virile character. He was especially characterized by his sympathetic and helpful consideration to those with whom he came into contact and was beloved by all who knew him. He retained his mental keenness and activity up to the day of his death, passing away as he wished unexpectedly and without any previous illness.

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We regret to report the tragic death of Mr. FRANK BERRY, of New Malden, Surrey, one of the victims of the Jersey Air Liner which crashed at St. Helier on Nov. 4. Mr. Berry, who had been the Chief Representative of Fletcher, Russell, & Co., Ltd., Warrington, on the South Coast, for many years, was 61, and joined the firm as a boy. After holding various positions in the Office, he was transferred to the outside staff in 1910, first representing Fletcher, Russell, & Co., Ltd., in the Midlands, and later in the South. He was a well-known figure in gas circles, and his untimely death will be deeply regretted by all.

The death has occurred of Mr. W. B. JAMES, Treasurer to the Lennoxtown Gas Light Company. An enthusiastic curler, he collapsed and died at the Ice Rink, Crossmyloof, Glasgow, on Nov. 12. He was 62.

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Mr. WILLIAM PEEL, of Darfolds, Worksop, Notts., Chairman of the Alfreton and South Normanton and Blackwell Gas Companies, died suddenly at the age of eighty-four on Oct. 28.

Forthcoming Engagements

November.

17.—B.C.G.A.—B.I.F. Joint Stand Committee, 2.30 p.m.; B.I.F. Joint Gas Conference of the B.G.F., 3 p.m.; B.G.F. Exhibitions Committee, 4 p.m.

17.—Midland Juniors.—Visit to John Harper & Co., Ltd., Willenhall.

18.—I.G.E.—Session at Public Health Exhibition, Agricultural Hall, Islington, 3 p.m.

18.—North of England (Auxiliary) Association.—Half-yearly Meeting at Newcastle-upon-Tyne, 2.30 p.m. Paper by J. S. Merry on "Boiler Water Problems."

18.—Southern Association (Western District).—Commercial Meeting, Rougemont Hotel, Exeter, 2.30 p.m.

19.—Wales and Mon. Juniors.—Meeting at Cardiff. Paper by N. H. Greenway, "Gas in Industry and Commerce."

19.—Western Juniors.—Visit to Portishead Generating Station, Bristol. Paper by H. C. Widlake, of Plymouth.

21.—L.C.C.A.—Finance Committee, 10.45 a.m.; Executive Committee, 11.45 a.m.; Central Committee, 2.30 p.m.

22.—Wales and Mon. Juniors.—Visit to Cardiff Engineering Exhibition.

23.—I.G.E.—Joint Lighting Committee, 2.30 p.m.

23.—I.G.E.—Pipes Committee, 2.30 p.m.

25.—Southern Association.—General Meeting, Hotel Victoria, Northumberland Avenue, W.C. 2, 2.15 p.m. Paper by S. F. Dunkley on "Quality Control and a System in Operation." Committee Meeting, 11.45 a.m.

25.—London and Southern Juniors.—Annual Dinner and Concert, Empire Restaurant, Victoria, S.W. 1.

26.—Scottish Western Juniors.—Visit to Greenock Corporation Gas Department.

(There will be no meeting of the Central Executive Board of the National Gas Council or of the Central Committee of the Federation of Gas Employers during the Month of November.)

December

1.—Midland Juniors.—Paper by F. A. C. Pykett, "The Distribution of Gas at Coventry."

2.—I.G.E.—Joint Committee on Complete Gasification under Pressure, 3 p.m. (*Transferred from Dec. 8.*)

3.—Manchester and District Juniors.—Meeting at Blackburn. Paper by E. B. Field on "Advantages and Disadvantages in the Production and Distribution of a Low-Quality Gas."

The Institution Education Report

One of the contributors to the discussion on the 15th Report of the Gas Education Committee, 1937-38, appeared in our report as Mr H. Moys [Member of the Board of Examiners]. Actually it was his son, Mr. H. W. Moys, who addressed the meeting. We regret any inconvenience the error may have occasioned.

Institution of Gas Engineers

Members of The Institution of Gas Engineers will be welcome at a Meeting of the Refractory Materials Section of the British Ceramic Society on Thursday, Nov. 17, at 10.20 a.m. in the Rooms of the Federation of British Industries, 21, Tothill Street, S.W. 1, at which Mr. V. H. Stott, M.Sc., will read a Paper on "The Evaluation of the Squatting Temperatures of Cones used in the Determination of Refractoriness."

Amalgamation and Grouping

Chepstow and Caldicot.

Among the objects of a Special Order for which the Chepstow Gas Company intend applying to the Board of Trade, under the Gas Undertakings Acts, 1920 and 1934, is an extension of limits of supply and the acquisition of the Caldicot and District Gas Light and Coke Company, Ltd. Both the undertakings concerned are controlled by the Severn Valley Gas Corporation, Ltd,

News of the Week

The 32nd Annual Convention of the Canadian Gas Association will be held in the City of Hamilton, Ontario, on Tuesday and Wednesday, June 6 and 7, 1939. The Royal Connaught Hotel is to be the official headquarters.

Chesterfield Corporation's First Air Raid Shelter is now in course of construction. Situated at the Gas-Works, it is intended for use by the employees, and is being built of reinforced concrete. Accommodation will be provided for 100 men.

With Reference to the discussion which followed Mr. F. T. Laws' Paper to the London and Counties Coke Salesmen's Circle, published in the "JOURNAL" for Oct. 19, Mr. Laws points out that the Tottenham and District Gas Company's consumers are asked to contract to use the Company's coke unless supplies are already being obtained from other sources.

An Extraordinary General Meeting of the Institute of Vitreous Enamellers will be held at the Chamber of Commerce, New Street, Birmingham, on Tuesday, Jan. 10, 1939, at 3 p.m. The business of the meeting will be to consider whether No. 28 of the Articles of Association be altered so as to render valid the nomination and election of suppliers and others to the Council of the Institute.

The New Main Extension, constructed at a cost of nearly £10,000 from Brigg Gas-Works, Lincs., to Broughton, was brought into operation on Nov. 9 in the presence of members of Brigg Rural Council, Broughton Parish Council, representatives of the contractors, and other interested parties. Subsequently the visitors inspected the gas-works and were entertained at lunch at the Angel Hotel, Brigg.

Cookery Demonstrations recently held by the Llanelly Gaslight Company, in collaboration with the Parkinson Stove Company proved to be highly successful. Cookery lectures were given by Miss P. M. Allen, *Diplomée*, N.S.T.C.D.S., on the Parkinson "Renown" cooker in the demonstration hall at the showrooms, and great interest aroused among housewives. Attendances for the week totalled 1,128. An exhibition of Parkinson cookers, fires, and radiators was also staged, and a very good demand for these appliances was experienced.

An Application for a supply of gas to serve the new factories of the industrial estates at Larkhall and Carfin has been made to Lanark County Council. It is proposed to erect three blocks of buildings at Larkhall and six blocks at Carfin. The Gas Committee have agreed to offer no objection to the laying of the necessary gas mains to the factories provided that the total cost was borne by the Industrial Estate, Ltd. It was also agreed that in the event of the Company taking a reasonable quantity of gas, full consideration would be given to the question of appropriate rebates being allowed to them.

Another Film "Link Up" appeared in the Birkenhead Gas Department showrooms a few days ago, when prominence was given to a special window display, in which new methods of washing were contrasted with the old. Alongside the latest type of gas washing was shown an old-fashioned dolly tub, mangle, and all other unsightly appurtenances of washing day a generation ago. This display "linked-up" with the film "Vessel of Wrath." There was a show card on the old style kitchen washhouse display, worded "These are the old Vessels of Wrath." In front of the gas washing machine, &c., was another card inscribed "These are the Vessels of Joy."

In the Course of a Public Enquiry at Lincoln on Nov. 8 into Lincoln Corporation's application for consent to a loan of £62,967 for the erection of a gasholder of 3 million cu.ft. capacity, it was stated that at present the storage capacity of the three gasholders at Bracebridge were only sufficient for 12 hours. The Engineer and Manager, Mr. George Wright, said he would not be prepared to take the responsibility of continuing the Department in that way. In reply to a question by the inspector who conducted the enquiry (Mr. F. Seabrooke), the Town Clerk said the Gas Undertaking did not make a practice of using the profits of the Department to relieve the rates. The general practice was for any profit made to be given back to the consumers in the form of a reduced price of gas. The Inspector: You are hoping that the present scheme will not affect the general rate or the price of gas? Town Clerk: That is so.

Among the Objects of a Special Order under the Gas Undertakings Acts, 1920 to 1934, for which the Sutton-in-Ashfield U.D.C. intend applying to the Board of Trade is the alteration and definition of the limits within which the Council are authorized to sell gas.

By a Large Majority the Llandovery Town Council have decided in favour of gas for the public lighting of the Borough. With one exception all members of the Council attended to consider the tenders submitted by the Llandovery Gas Company and the West Cambrian Power Company. Some of the arguments used in favour of using gas were that it was cheaper, gave excellent lighting, the Gas Company employed local men and paid heavy rates, and that the use of more coal would help towards greater prosperity in the coalfields. The Gas Company, which has been in existence for 100 years, was given the contract for the next seven years.

School Authorities in two widely separated North of England communities have lately decided in favour of gas for domestic economy lessons. At Aireborough, in face of strenuous advocacy of electricity in certain quarters, the decision to install gas cookers at the Grammar School was made on grounds of lower cost and the argument that the scholars were more likely to be concerned with gas cooking in their adult life. At Morecambe (Lancashire) a new £85,000 grammar school includes a modern kitchen, for teaching purposes, equipped with gas-heated steamers, ranges, cookers, hot-closet and water boiling installations, these having been supplied by Morecambe Gas Department to the order of the Lancashire County Education Authority.

There Was a Crowded Attendance at the George Street headquarters of the Plymouth and Stonehouse Gas Company on Nov. 8, when the demonstration room was re-opened. Colonel R. L. Norrington, Chairman of the Company, said he hoped it would be regarded by customers as a place where they could come and get advice at any time. Colonel Norrington then presented prizes to the successful competitors in an essay competition, organized by the Company, in which Plymouth and district housewives were asked to write on "Why I Like Gas for Cooking." The first prizewinner received a 45 N.T. "New World" cooker, the second prizewinner a 325 N.Y. "New World" cooker, and the third prizewinner a "Newlyn" water heater, while consolation prizes of "High Beam" gas fires went to three other competitors.

In an Address on "Fuel Economy," which he delivered to the Halifax Rotary Club on Nov. 2, Mr. M. T. Thompson, Managing Director of Drakes, Ltd., gave many interesting facts concerning gas plant and its manufacture, new uses for gas including motor propulsion, and the Industry generally. Thanking Mr. Thompson, Mr. W. B. McLusky, Engineer and Manager of the Halifax Gas Department, said he had had the advantage of knowing the founder of Mr. Thompson's firm. Mr. Jonas Drake was the founder but Mr. Armitage Drake established it on its present footing. Not only was it one of the oldest firms, but ranked among the big five in the British Isles, being not only pioneers but still in the forefront of originators of new designs. Mr. Thompson himself had been a tremendous power, his inventive genius having been of great service to his firm.

Great Pride is Taken by Dunster residents in the public lighting of their beautiful village, and indeed many of them are now claiming that it is the best lighted in West Somerset. The improvement has been made as a result of a seven-year contract for the lighting of the village secured a few months ago by the Minehead Gas Light and Coke Company. Although such a tremendous difference has been noted in the lighting of the village this winter as compared with last, there has been no increase in the number of lamps. Most of the old points have been used, although one or two adjustments have been made. Mr. H. T. Rainbow, a parish representative on the Williton Rural District Council, and a member of the Parish Council, expressed high appreciation of the village's new lighting. "Everybody is more than pleased with the improvement," he said, "and the Gas Company are very heartily to be congratulated on justifying their claims so handsomely, on the workmanship they have put in, and the results generally attained."

Following Representations from Industrial Quarters the National "Safety First" Association has decided to amend the conditions of the Travelling Safety Scholarship, details of which were recently announced. Originally entry was described as being open to "students of recognized educational institutions" and "articled apprentices." Various industrialists have suggested that injustice would thereby be done to many suitable candidates who are certainly apprentices but who have not been formally articled, and modification has accordingly been made so that young people in this category will be eligible for entry. The Scholarship has been made possible by the generosity of Imperial Chemical Industries, Ltd., and the award will take the form of a visit to the United States or Canada, or both, for the study of safety conditions in the summer of 1939. Entrants may be of either sex but must be between the ages of 18 and 25. Full particulars may be had on application, with stamped envelope, to the National "Safety First" Association.

Christmas Fare was the subject of recent demonstrations at the showrooms of the Leamington Priors Gas Company. The inaugural session on Nov. 7 was marked by the presence of the Mayoress (Mrs. Charles Davis), who was welcomed by Alderman H. Mason, J.P., Chairman of the Leamington Company. The Mayoress said it gave her great pleasure to open the demonstrations, for she felt they were of great benefit. As different dishes were cooked daily she did not think one could do better than attend every day. Of all domestic accomplishments she felt that good cooking came first, and if they had to make a choice between good food, properly cooked, and playing fields, she felt that all would say that food and cooking took first place. All the week Miss M. Harris, N.S.T.C., M.C.A., of Messrs. Sidney Flavel & Co., Ltd., gave demonstrations, in connexion with which a Christmas shortbread competition was held, the principal prizes for which were an "Ascot" sink heater, a Flavel 7-radiant fire, and a portable heater; there were also consolation prizes.

A.R.P. Display AT Cannock

This interesting A.R.P. display was recently arranged in the showroom window of the Cannock and District Gas Company, where it created considerable local attention.

The Films in Scotland

Gas Affairs Discussed at Inaugural Luncheon

In the last ten years the Gas Department had made a remarkable recovery, said Lord Provost P. J. Dollan, of Glasgow, at the B.C.G.A. luncheon in that City to celebrate the launching of the new films on Nov. 8. The Department, he remarked, was conducted with enterprise and efficiency, and its sales and publicity section was not bettered by any private firm. He felt that the Corporation, with an annual revenue of £22,000,000, spent too little on publicity. The sum of £4,000 annually was inadequate to bring home to the citizen the services that were available.

They could do a great deal for the Industry if they abandoned their conservatism—and he was not using this word in its political significance. He was hopeful that soon the time would come wnen coal fires in their homes would be scrapped and people would derive their fuel from gas or electricity. Coal fires were fifty years behind the times, and only prejudice kept them going. In this connexion a good deal of educational work might be done by Glasgow Corporation Gas Department which would thus help to make the City a healthier place to live in.

Mr. J. W. NAPIER, Alloa, dealing with education in the Industry, said that future success depended on the education of youth in gas science. The Industry had done more than any other to further the interests of technical education. Research was essential to the life of any industry. They needed University trained students in the laboratories of the works. The Institution of Gas Engineers spent £10,000 annually on research and had a fellowship at Leeds University for research work into the manufacture and uses of gas. The Gas Light and Coke Company and other undertakings spent largely in this connexion.

Referring to Glasgow Corporation's refusal of the offer of a bulk supply of coke oven gas, Mr. Napier said that other cities had found this coke oven gas supply advantageous. If Glasgow took a supply it would greatly benefit local industries. It had been suggested that Glasgow's decision had been due to the fear of causing unemployment, but he estimated that the number thrown out of work would be only a quarter of 1% of the present total of Glasgow unemployed.

Lord Provost DOLLAN said he was interested to hear of the William Murdoch centenary next year, and would be glad if it could be arranged to have the celebrations in Glasgow where they would mark the occasion by giving the Gas Department an opportunity to put up a first-class show.

Mr. A. S. NISBET, Paisley, proposed the toast of "The Guests," and Captain S. J. GRAHAM, Manager of the Empire Exhibition, replied, expressing appreciation of the part played by gas at Bellahouston.

Mr. JAMES DICKSON, Kirkintilloch, proposed a vote of thanks to the Chairman, Mr. David Fulton, Helensburgh, and congratulated him on the excellent work he had done as Convener of the Exhibition Gas Committee.

Mr. FULTON, responding, thanked the officials and staffs of various undertakings for the assistance they had rendered him.

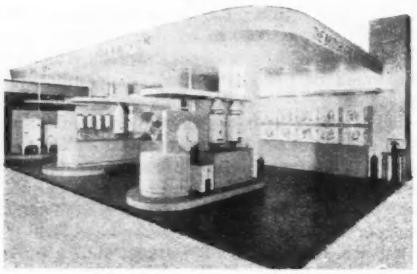
Improved Lighting at Leamington

Gratifying Testimonial to Gas

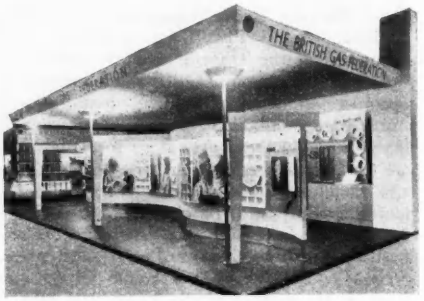
The lighting of the Upper Parade and Bath Street, Leamington Spa, is to be improved as a result of the adoption by the Town Council on Nov. 9 of the Watch Committee's recommendations.

The Borough Engineer, we learn from Mr. R. S. Ramsden, Director, General Manager, and Engineer of the Leamington Priors Gas Company, has placed an order with the Company for the provision and fixing of steel columns down the centre line of the Upper Parade, each carrying a pair of "Keith" high-pressure lamps, 10 ft. apart across the Parade and 25 ft. above the carriageway. The line of columns down the centre of the Parade is to correspond with the arrangement in a greater length of Parade and the increased mounting height is, of course, to comply with the Ministry of Transport Report. The Borough Engineer has also ordered new high-pressure lamps in improved positions for Bath Street, which is an extension of the Parade. There will also be in both the Parade and Bath Street a number of Sugg's "Rochester" lamps with reduced lighting control for positions where the lamps are alight all night.

A gratifying testimonial to the effectiveness of gas lighting is provided by the statement of a Councillor during the discussion that even now small print in a newspaper can easily be read in Bath Street at night.



THE Gas Pavilion AT THE Woman's Fair



AT the Woman's Fair at Olympia the British Gas Federation have presented a complete picture of the service to women and to the whole community which the Gas Industry, as the largest public utility in the country, can give. This is a united demonstration by the supply undertakings and the many makers of appliances, and it shows the Industry working as a whole. By new and striking methods of design, not only equipment but the larger social activities of the Industry—the fight against smoke, public education in standards of health and nutrition—are demonstrated as the symbol of a modern public service.

The Theatre.

In one of the four divisions of the Pavilion stands a complete theatre where films, specially made to interest women in new methods of living and comfort, are shown at intervals through the day.

One of the most interesting parts of the exhibit is the demonstration of cookery given by M. Boulestin, whose restaurant is famous not only in London but far further afield in Europe. Here he is to teach in person.

The Curse of Smoke

Opposite the theatre stands a fascinating display which illustrates in a far more telling way than could bare facts or figures the damage to our national health, the destruction of amenities, and the dirt and labour of home caused by smoke. Ingenious devices bring home the facts in a new way—among them a "Disappearing City" of fog and dirt, which literally fades away to be replaced by the white and gleaming city of the future when smoke has been abolished.

—And the Cure.

Many authorities, including the Prime Minister, have warned the nation against smoke; the Gas Industry is the first to come forward with a practical remedy and the resources to put it into effect. Mr. Herbert Morrison has talked of making London a smokeless city. Here at once the need for action and the method are displayed.

Finally, the practical choice. Never before have the design and convenience of woman's home equipment reached so high a standard as it has to-day. Attractively displayed, with economy well to the fore, is a choice of gas equipment for the home which should be the envy of every woman.

Ipswich Opens Demonstration Theatre

On Nov. 3 the Mayoress of Ipswich, Mrs. George Underwood, opened the new demonstration theatre of the Ipswich Gas Light Company.

The theatre, which the Mayoress described as a further instance of the Company's progressive and enterprising spirit, is admirably equipped, and has been designed with the utmost regard to comfort and attractiveness. It occupies in the Company's Carr Street premises a mezzanine floor, formerly used for cookery demonstrations. This has been largely reconstructed, and fitted with a stepped floor, on which 150 comfortable tip-up seats, upholstered in broken-red leather, have been installed.

The walls are panelled in Australian walnut and the colour scheme is cream and green. The well-lighted stage is arranged in the form of a model kitchen, equipped with the latest types of gas appliance. The stage is also furnished with a movable screen for talkie-films. The projection apparatus is situated in a room behind the screen and at right-angles to it. The screening of the film is effected through an aperture in a wall by means of a mirror placed at an angle. The architects for the theatre were Messrs. Johns & Slater, of Ipswich, and the builders, Messrs. Sadler & Sons.

Mr. Henry Woodall, Chairman of the Company, presided at the opening ceremony, and there were also present Mr. Philip W. Cobbold (Vice-Chairman), Mr. H. St. G. Cobbold, Mr. Frank Prentice, Mr. G. H. Hewetson (Directors), Mr. G. A. Mallett (General Manager and Secretary), and Mr. C. E. Wright (Chief Engineer).

Mr. Woodall said that they were very anxious to be able to show in the best surroundings what gas could do. They hoped the new theatre would become a real educational centre. "In this country," continued Mr. Woodall, "we have the best materials in the world, and I feel sure that we can show you how best to cook them. But I am afraid, as a nation, our reputation as cooks is not a very high one. But I believe there has been a general improvement, and I am hoping that this building and the work done here will further that. Besides the cooking of food, we want to advise you as to food values and their proper balancing."

Declaring the theatre open, the Mayoress observed that the Company had always been noted for its progress and enterprise, and, with the new theatre, they were helping to maintain and improve the health of the people.

As a memento of the occasion, Mr. Woodall, on behalf of the Directors, presented Mrs. Underwood with a golden key.

Mr. Mallett stated that there would be lectures and demonstrations at the theatre twice weekly, and, in addition, there would be occasional competitions and films. They hoped to form a branch of the Women's Gas Council and to arrange special lectures and demonstrations for "newly-marrieds and brides-to-be," and, furthermore, they intended to develop their home service.

A cookery lecture and various demonstrations were given by the Company's demonstrator (Miss E. J. Gott), the audience also being entertained by a series of talkie films. At the conclusion of the programme tea was served.

Illuminating Engineering Society

Commercial Lighting Section

To provide further facilities to those interested in the subject of commercial lighting, a new section of the Illuminating Engineering Society has been formed, so as to afford an opportunity for members and visitors, who are particularly interested, to discuss in more detail all the particular applications covered by the Commercial Lighting Section. The Section embodies the lighting of offices, shops, shop windows, showrooms, and floodlighting.

Southern Association

Autumn Meeting

The Autumn General Meeting of the Southern Association of Gas Engineers and Managers will be held at the Hotel Victoria, Northumberland Avenue, W.C. 2, on Friday, Nov. 25, at 2.15 p.m.

Following the usual business of the meeting a Paper will be read by Mr. S. F. Dunkley, O.B.E. M.I.Mech.E. (Officer-in-Charge of Stores Testing, Gas Light and Coke Company) on "Quality Control and A System in Operation."

Athletic and Social

Birmingham Social and Recreation Society.

The Social and Recreation Society of the Birmingham Gas Department won third prize in the orchestral class at Blackpool Musical Festival recently.

Perth Whist Drive, Supper, and Dance.

The annual whist drive, supper, and dance of the Perth Corporation Gas Department was held on Nov. 9 in York House, when over 150 persons attended. Mr. A. C. Rea, Engineer and Manager, welcomed the guests. Miss Gowans, daughter of ex-Bailie Cowans, Gas Convener, presented the prizes, and Mr. T. Sawers, Assistant Manager, proposed the usual vote of thanks.

Leicester Social.

Councillor F. Acton fulfilled his last engagement as Lord Mayor of Leicester at the Gas Department's dance at the Palais de Danse, Leicester, on Nov. 8. Over 600 ensured the success of the event, a feature of which was a search for Mr. Therm. First to challenge him correctly was Mr. Holyland. Mr. J. Carson was M.C. A whist drive was also held, for which the Lady Mayoress presented prizes. Members of the Gas Committee present were Councillors R. Moore, W. H. Freestone, S. Edwards, F. E. Oliver (Vice-Chairman), and Mr. J. Mitchell (Engineer and Manager).

Edinburgh Gas Department's Gymkhana.

The Sports Club of the Edinburgh Gas Department held a very successful gymkhana in St. Mary's Street Hall at the end of the week. A large audience showed appreciation of items by the following: William Goldie (tenor); Edinburgh Harmonica Band; Leith Health and Strength trio; boxing by members of Loanhead A.B.C.; wrestling by members of the Milton and Edinburgh City Police clubs; displays of gymnastics by members of the Portobello Guild; Indian Club swinging by Robert Young, Milton; Highland dancing submitted by Bertie Robertson's troupe, accompanied by a piper from the Edinburgh Corporation Transport Pipe Band; and D. Laidlaw (accompanist).

Messrs. George Wilson's Staff Dinner.

On Nov. 4, Mr. J. H. Wilson, Chairman and Managing Director of Messrs. George Wilson Gas Meters, Ltd., presided at a staff dinner in Coventry at which 40 members of the staff were present. During the course of the evening Mr. J. H. Wilson presented to Mr. W. Carnell, an employee of 24 years' service and now aged 84 years, a cheque on behalf of the firm. Mrs. I. R. Amor, Secretary of the Company, presented gifts on behalf of the staff, and Mr. W. Toman presented a cheque on behalf of the Works employees. During his speech, Mr. Wilson paid tribute to the wonderful service Mr. Carnell had rendered the Company, and, in his reply, Mr. Carnell outlined his career, which commenced in the Navy, where he had many interesting experiences and was highly esteemed by all. The party concluded their evening at the Coventry Hippodrome.

Cambridge Bowls Club Supper.

Following the most succesful season in its history, the Cambridge Gas Company's Bowls Club held a celebration supper on Nov. 12, when the Engineer and Manager, Mr. J. Hunter Rioch, who is also a Vice-President of the Club, occupied the Chair. During the presentation of the various trophies, the Chairman expressed his belief that these sporting and social activities were of great value in promoting a good spirit in business, and should mean that the same interest and keenness would be reflected in the daily work. The Club was to be congratulated on the outstanding achievements of the season, but a special word was due to the Captain (Mr. E. Cooper), who had not only led the team so well, but had been associated with all the cup-winning rinks, and in addition had gained the Club Championship. The team had after 26 years, reached the premier position in the Cambs and District League; won the Lacon and Lord Eltisley trophies for triple rinks; reached the final of the Dale Cup competition; and finished second to Norwich in the Inter-Gas Companies Tournament after a very close game.

S.B.G.I. Golfing Circle

Autumn Meeting

The Autumn Meeting was held at Walton Heath on Oct. 31, with a good attendance and excellent weather.

Mr. G. V. Perry, with one down on bogey, won the Yates Bowl. Messrs. John B. Clay and H. Curtis were winners of the afternoon foursomes.

Women's Gas Council

Carmarthen Branch Inaugurated.

On Oct. 28 there was inaugurated a branch of the Women's Gas Council in Carmarthen. A meeting of ladies was held to hear Miss Halpin, Organizing Secretary, who came from London to discuss with them the formation of a branch. Miss Halpin explained the aims and objects of the Council and showed how this organization can help the housewife by keeping her in touch with all the developments by which modern science makes the lot of the housewife an easier one, and which so give her leisure to play her part in the life of the community outside the home.

A branch was thereupon formed and the following officials elected to serve for one year: Chairman, Mrs. Mitchell; Secretary, Miss Evans; and Committee: Mrs. White, Mrs. Williams, Mrs. E. D. Jones, Mrs. Lowndes, and Miss Mary Jones.

Manchester First Aid Class.

A meeting of the local branch of the W.G.C. for forming a First Aid Class in connexion with A.R.P. was held in the Lecture Theatre of the Manchester Gas Showrooms, in the Town Hall, on Monday evening, Oct. 31. Major E. S. Burt Hamilton, M.C., M.B., F.R.C.S., E.D., First Aid Commandant, St. John Ambulance Brigade, and Miss E. Haliday, Lady Corps and Superintendent, spoke at the meeting, and explained fully the aim of the classes.

A Nursery Rhyme Display

This ingenious display by the Alliance and Dublin Consumers' Gas Company linked up the well-known nursery rhyme with the use of gas fires for healthy heat for the children.

Gas Exhibition at Plymouth

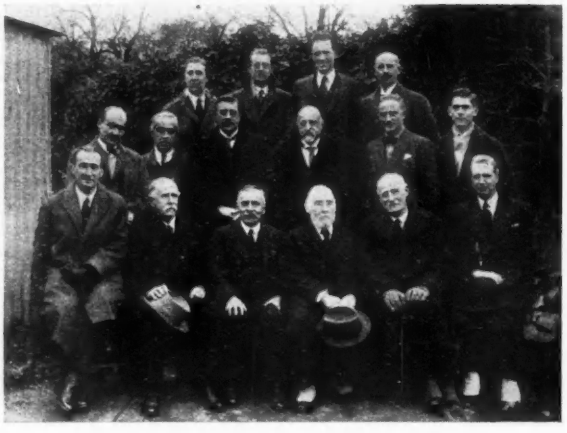
A very successful Gas Exhibition was held from Oct. 17 to 29 inclusive at the Abbey Hall, Catherine Street, Plymouth. The Exhibition was opened by the Lady Mayoress of Plymouth, Mrs. Solomon Stephens. The Lord Mayor presided and expressed a preference for gas cooking, a statement which was given added importance by the fact that Mr. Solomon Stephens is the head of a well-known firm of bakers.

Throughout the whole fortnight interest was sustained in the Exhibition, all the available seating accommodation being fully occupied during most of the cookery demonstrations given by Miss K. Jenkin, of the Plymouth and Stonehouse Gas Company, and Miss M. C. Hawkins, of Radiation Ltd. Talks on home laundering were given by Miss S. B. Allan, of Messrs. W. H. Dean & Sons, Ltd. In addition to the general public, parties of schoolgirls from the various schools attended the cookery demonstrations each afternoon. The total attendance throughout the fortnight was 5,900.

Three cake-baking competitions and an essay competition proved very popular. The prizes for the schoolgirls' competition, which attracted 86 entries, were presented on Oct. 22 by Mrs. R. J. H. Clark, wife of the Chief Engineer of the Company—Mr. G. H. Bolton (Secretary and Director) presiding. The following Saturday the prizes were presented in the housewives' competition, for which 261 entries were received, by Mrs. G. H. Bolton—and on this occasion Colonel R. L. Norrington, the Chairman of the Company, presiding. On each occasion "Miss Therm" was in attendance and presented bouquets.

In the essay competition, which also attracted a large number of entries, prizes consisting of "New World" cookers, "High Beam" gas fires, and a "Newlyn" water heater were given.

Professor Townend's Inaugural Address at Leeds University



Zoroastrians at St. Albans, 1927.

It is customary for newly appointed Professors at Leeds University to give a Public Inaugural Lecture. Professor D. T. A. Townend selected as his subject "A New Era in Combustion," the lecture being given before the Vice-Chancellor, Mr. B. Mouat Jones, D.S.O., M.A., and members of the University on Monday, Oct. 31, in the new large Chemistry Lecture Theatre, and illustrated by both lantern slides and experiments.

After thanking the Vice-Chancellor for the welcome he had accorded him, Professor Townend said that he was deeply sensible of the honour which had been conferred on him by the University in his appointment as Livesey Professor in succession to Professor Cobb—the more so because of the eminence of the two previous holders of the Chair. The first, the late Professor Bone, under whom it had been his privilege to work at South Kensington for some sixteen years, did much during his six years at Leeds to lay down the lines on which the Fuel Department had been built up—and Bone had always paid high tribute to the foresight of Professor Smithells, the backing of the Gas Industry, and the progressive attitude of the University, all of which were so largely responsible for bringing it into being. Bone was always proud of the fact that in Leeds, in the county of his adoption, was established the first Department of Fuel Technology in this country—and that he had been its first Head.

Since 1912, under the direction of Professor Cobb, the progress and reputation of the Department had become well established, and it was now held in high regard by the great industries which it served—and particularly by the Gas Industry.

Professor Cobb had come to it as one not only of academic attainment, but also of wide industrial experience, and this happy, though only too rare, combination had been reflected in the work which he had done, notably in the fields of coal carbonization, refractory materials, and metallurgy. The activities of the Department in all these branches were well known, and Professor Townend counted himself fortunate in being now associated with the fine array of colleagues who were still pursuing them; included were the staffs of both the Joint Research Committee of The Institution of Gas Engineers and Leeds University, and also of the Alloy Steels Research Committee of Iron and Steel Institute, all of whose work was opening up such important avenues.

Professor Cobb had played a long and fine innings, and now that he was retiring, it was gratifying to know that he would be remaining in the locality, for they hoped for a long time yet to have the advantage of his wide experience and fine judgment.

Home of Combustion Research.

Professor Townend said that, in coming to Leeds, he felt no stranger. Bone had frequently spoken of the early days of the Fuel Department, of his work with McCourt on surface combustion, and of his early experiments on high-pressure explosions; incidentally it would interest them to know that he had brought back, as a museum piece to its first home, Bone's original explosion bomb. It had not been many years previously that the University, then as the Yorkshire College, had formed an integral part of the Victoria University, where in Owen's College, Professor H. B. Dixon had developed so brilliantly his famous combustion school—and Bone had been one of his pupils. About this time also, Professor Smithells had carried out his well-known experiments on combustion in stationary flames and on flame structure. Leeds and Manchester might well be regarded therefore as a real home of modern combustion research in this country.

Professor Townend then showed a photograph, which we reproduce, taken in 1927 at St. Albans, of a gathering which later formed itself into a group under the title "Zoroastrians" (Fire Worshippers). Among others well known in the Gas Industry, in the front row were Professors Dixon, Baker, Armstrong, and Smithells, and Mr. H. James Yates; and in the middle of the second row Professor Bone and Sir Robert Mond. Dixon and Smithells, who paid frequent visits to Bone's laboratory at South Kensington, were keenly interested in whatever investigations were in progress—and their kindly encouragement was always greatly appreciated.

Flames and Explosions.

Turning to the subject of his lecture, Professor Townend said that he had had some difficulty in selecting a suitable theme, but had eventually decided that he could not do better than say something about our present knowledge of flames and explosions and indicate the new fields which were now opening up. Much of what he had to say and to show would be familiar to many, but those who were most interested in flame phenomena always found a never-ending fascination in studying them.

More than a century ago Sir Humphry Davy taught them to regard flames as "aeriform or gaseous matter heated to such a degree as to be luminous" and arising from "the combustion of an explosive mixture of inflammable gas or vapour and air."

When such an explosive mixture was stationary a flame, once initiated, would travel through it at a rate which would depend upon a number of circumstances, the uncombined gases being ignited either by conduction of heat from the burning gases, or under extreme conditions by adiabatic compression in a shock wave. Flame progress would be continuous so long as any of the uncombined gases remained unburned.

When an explosive mixture was itself in motion, as in a Bunsen flame, there was a balance between the rate of supply of the mixture and the rate of flame travel through it in the opposite direction—so that the flame appeared stationary. An apparently stationary flame was therefore no exception to the general rule that flames arise by motion in an explosive medium, and it would be apparent therefore that the study of flame reactions in explosions provided one of the most con-

venient means of understanding the chemical processes concerned.

Although Sir Humphry Davy was the first to elucidate the principles of flame propagation, it was not until 1883 that the successive phases of gaseous explosions became well understood when Mallard and Le Chatelier successfully applied flame photography to the problem.

Flame Photography.

The lecturer then showed a number of slides illustrating the progress which had been made in flame photography during the past fifty years. Whereas Mallard and Le Chatelier had to employ falling wet plates with velocities not exceeding a metre per second and were restricted to observations with the highly actinic flames of carbon disulphide in either nitric oxide or oxygen, to-day sensitive films were rotated at a constant film speed equivalent to 200 metres a second, so that it had become possible to measure periodic movements in explosions up to 250,000 per second. Another method which had recently been highly developed was that of shadow photography by means of which not only could events occurring in explosions where photographically non-actinic flames were obtained be analyzed, but the passage of pressure waves detected; this was only otherwise possible when a re-illumination of hot products in their path occurred. A number of illustrations of the wonderful records of Payman at Buxton and Fraser at South Kensington were shown, attention being particularly drawn to the part played by compression waves in the development of gaseous explosions and in the eventual setting up of detonation.

Professor Townend also drew attention to a phenomenon observed in certain explosions in closed vessels, where a shock wave appeared to be initiated in the products behind the flame front; its origin was uncertain and he thought that eventually there might be shown to be an analogy between this occurrence and some observations which had recently been made in the study of cool flames at South Kensington, to which he would refer again.

In concluding this part of his lecture, Professor Townend showed some instantaneous shadow photographs by Payman and some direct records made by Fraser with his latest revolving-mirror camera; and he paid tribute to the remarkable achievements in this field of work.

The lecturer then asked his audience to forget for a moment all the exciting stages of gaseous explosions due to the generation and superposition on the burning medium of compression waves, and to consider again a simple flame as ordinarily seen, at, say, the mouth of a burner.

A New Era.

Mallard and Le Chatelier had taught them that the rate of burning, or, in the case of a travelling flame, the flame speed, depended upon the conduction of heat from the inflamed to the uncombined gases, and the two principal factors concerned were, first, the heat generated in the flame and, secondly, an assumed ignition point to which the gases ahead of the flame had to be raised. Now while the first of these factors needed no qualification, the second was extremely difficult to define, and he thought that our knowledge of the slow combustion processes leading up to spontaneous ignition was now developing so rapidly that it would be correct to say that we were now entering upon a new era in combustion.

We now appreciated, for example, that the term "ignition temperature" was without scientific significance, for to-day the spontaneous ignition of an explosive mixture was known in any set of circumstances to depend largely upon the partial pressures or absolute concentrations of the reacting media involved.

The fact that our atmospheric pressure was of the order of 760 mm. mercury was entirely accidental, and it could be predicted therefore that a proper understanding of combustion phenomena would only be obtained by studying them over wide enough pressure ranges.

Professor Townend said that during the past few years he and his collaborators had worked on these problems at South Kensington and their attention had also been particularly directed to the importance of the phenomenon known as a cool flame. Actually we knew very little about the chemical processes concerned in cool flames although our ideas now seemed to be taking some shape; it would suffice for the moment to say that a cool flame was one of incomplete combustion, developing very little heat and travelling very slowly. And while, as we know, the velocity of a normal flame depended upon the available heat in the medium through which it was travelling, that of a cool flame was almost constant, and was propagated most easily through those mixtures which were the most reactive during slow combustion.

In developing this work they had been much guided by an observation made by Dr. A. G. White in 1919 in the laboratories of Nobels Explosives, Ltd., at Ardeer. When determining the inflammable range of ether-air mixtures at atmospheric pressure, White made the important discovery that there were two independent ranges of inflammability, one for normal flames (2%-9% of ether approximately) and the other for cool flames (19-45%) separated by a range of mixtures which were incapable of flame propagation. Subsequently White explored these ranges at reduced pressures in a wider tube and established that there were two separate systems for each type of flame propagation which linked up at a pressure of about 600 mm. of mercury. The normal flame system centred upon the theoretical mixture for complete combustion and the cool flame system upon the mixture having an ether-oxygen ratio of about 1 : 1.

From other observations in their own spontaneous ignition experiments under pressure the lecturer and his collaborators had felt that at higher pressures the cool flames of ether as located by White should give rise to the initiation of normal flames, and on examining the matter this prediction was borne out.

Coal Flame Phenomena.

The manner in which a cool flame gave rise to normal ignition had provided a most fascinating study. Time only allowed of his saying that at a high enough pressure, which was very critical, a blue flame was formed behind the cool flame; the subsequent events seemed to depend entirely upon the amount of unconsumed oxygen left behind by the cool flame and in suitable circumstances detonation might even be set up.

It was very fortunate that with ether-air mixtures these effects could be studied with cold media in glass tubes, because it would be very difficult closely to examine them under any other experimental conditions. Actually they had now located cool flame ranges with all hydrocarbons with more than three carbon atoms, and also with many other hydrocarbon derivatives; the secret was that in any particular case a high enough working pressure had to be employed. A most interesting aspect of the work had been in regard to the chemical processes involved, but they had still very much to learn in that connexion. Whether cool flame phenomena played any part in the combustion of a simple hydrocarbon such as methane it was as yet impossible to say. An interesting fact was that with simple molecules the media having a combustible-oxygen ratio between 2 : 1 and 1 : 1, which were most productive of cool flames, normally lay within the range for ordinary flames; with more complex molecules this was not the case and it would be a curious happening if, as now seemed possible, it might eventually be shown that the combustion of higher hydrocarbons had shed light on that of the simpler members.

If he might summarize his views briefly, the lecturer said that while until now we had regarded flame reactions mainly in terms of the heat available from the complete combustion of the reactants, to-day we had to recognize the occurrence of events which were more related to the slow combustion and spontaneous ignition of the media concerned. These events might be critical to pressure changes and our understanding of them would progress hand in glove with advances in our knowledge of chemical kinetics. It was quite certain that no longer must our observations be restricted to conditions solely at atmospheric pressure. He was looking forward in the Fuel Department at Leeds to investigating, as opportunity allowed, some of the issues to which he had endeavoured to direct attention.

In conclusion, Professor Townend said that he had been greatly helped in his work at the Imperial College by two successive holders of the Gas Light and Coke Company's Fellowship, Drs. E. A. C. Chamberlain and M. Maccormac. He wished on that occasion particularly to thank Dr. Maccormac (who, during the past year, had done much to elucidate the origin of the "blue" flame about which he had told them), for carrying out a number of experiments to illustrate the points of his lecture.

Bagging Off Large Gas Mains in Emergency

by
R. G. MARSH
(Distribution Engineer to the Birmingham Gas Department).

In connexion with Air Raid Precaution measures at gas-works, the question of making provision for the bagging off of large trunk mains, more particularly in the vicinity of the works, has been engaging the attention of the Birmingham Gas Department.

The distributory system in the Birmingham area of supply is fed from a number of works, and should damage occur in the neighbourhood of the governor houses of any one of the works, and the control valves be damaged or become inaccessible, further considerable danger may arise from the main system.

The question of fixing control valves on the street mains in the vicinity of each works was considered, but it was thought that there would be very great likelihood of these becoming damaged or jammed through vibration or shock, rendering them inoperative just at the time they would be most required. In addition to this objection, there is the considerable expense involved, and further, the almost insuperable difficulty in finding suitable positions to fix such valves, owing to the extremely congested condition of the plant in the highways.

After a considerable amount of experimental work had been done in the matter, the method described as follows and as illustrated by the sketches was evolved.

The method has the advantage of simplicity and reliability, and can be provided for with comparatively little expense. In the positions selected on the distributory system where facilities for rapid bagging off are considered likely to be of the most value, a saddle is fixed on the top side of the main. In our particular design the saddle incorporates a special form of valve, the whole unit being designed to take up as little room as possible under ground.

From the top side of the valve a 6-in. tube is brought up to a convenient depth below road surface and finished off with a cap. The cap is screwed with a coarse thread for easy operation and a leather washer is fitted inside it to make the joint gas-tight.

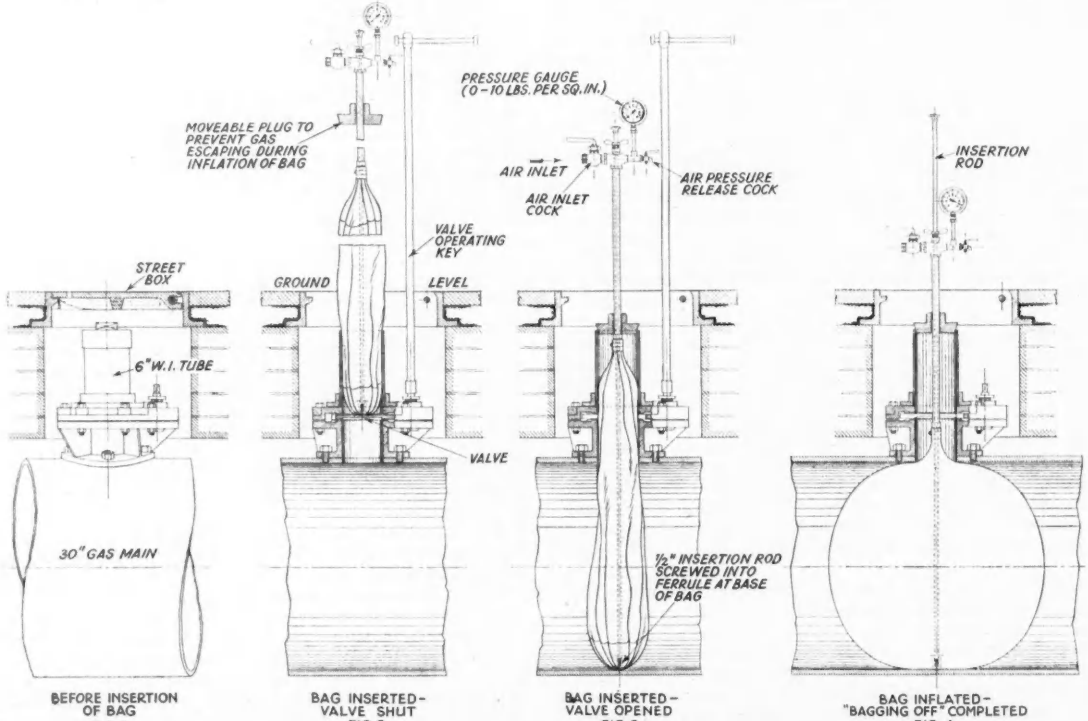
A street box is fitted in the surface of the highway preferably of the type with a completely removable lid. The street box is of sufficient size to give convenient access to the 6-in. tube and also room for the street valve key to be inserted to operate the valve. The complete arrangement is shown on diagram fig. 1.

A 6-in. saddle and lengthening piece is used for 30-in. and 36-in. mains. Smaller connexions would be suitable for mains of 24-in. diameter and below.

The bags to be used for the work are of special design and are spherical in shape except for the top portion, which is elongated slightly in order to fill up the 6-in. aperture cut in the top side of the main. (It is found that a strictly spherical shaped bag leaves an aperture on the top through which gas can pass.)

For this particular adaptation the single type of bag is used, not that with the loose interior bladder. At the bottom of the bag, and on the inside of it, there is fitted a flange with a screwed socket, the upper part of the socket being flared. The neck of the bag is attached by any suitable means, such as a Jubilee Clip, to a nozzle at the end of the steel tube, the length of the steel tube being that which is necessary at least to reach from the ground surface to the top of the main. At the top of the tube a cross is attached, to one arm of which is fitted a pressure gauge and to the other a control cock with a union for the pump connexion. The top side of the cross is fitted with a gland.

A long steel rod with a thread at the lower end is passed through the gland, down through the steel tube, through the


MOVEABLE PLUG TO PREVENT GAS ESCAPING DURING INFLATION OF BAG
PRESSURE GAUGE (0-10 LBS. PER SQ. IN.)
AIR INLET
AIR INLET COCK
AIR PRESSURE RELEASE COCK
INSERTION ROD
VALVE OPERATING KEY
STREET BOX
GROUND
LEVEL
6" W.I. TUBE
VALVE
30" GAS MAIN
½" INSERTION ROD SCREWED INTO FERRULE AT BASE OF BAG
BEFORE INSERTION OF BAG FIG. 1
BAG INSERTED - VALVE SHUT FIG. 2
BAG INSERTED - VALVE OPENED FIG. 3
BAG INFLATED - "BAGGING OFF" COMPLETED FIG. 4

Details for Operating Special "Bagging Off" Apparatus.

neck of the bag, and right down to the bottom of the bag. The flared end of the socket makes it quite easy for the rod to find its way into its screw thread. The rod is then pressed downwards, so as to stretch the bag tightly, and the rod should be of just sufficient length so that when the bag is extended the knob on the upper end of the rod is just above the gland. The gland is then tightened up so as to hold the rod in position with the bag extended.

The operation of inserting the bag is as follows: The street box is opened and the cap at the top of the 6-in. stand-pipe on the main is removed. The extended gas bag is then inserted in the tube and pushed down as far as it will go until it reaches the disc of the valve. Fig. 2 illustrates the extended bag in the position as described. The bag is then raised slightly to allow the disc of the valve to move and the valve is opened and the bag allowed to enter through the valve in the main and is pushed right down until the bottom of the bag is pressed firmly on to the interior of the bottom side of the main.

At this point a tapered wooden plug, which is threaded on to the steel tube, drops down on to the top of the 6-in. pipe and is pressed into position in order to prevent undue waste of gas.

A hand pump is then attached by a suitable hose to the inflating cock, and the bag is filled. Air from the pump passes down the annular space between the inside of the steel tube and the rod.

It will be observed from fig. 3 that in its extended position the whole of the bag does not, at first, enter the main, but as the operation of inflating proceeds, the upper portion of the bag is drawn down into the main, assisted by a little pressure on the cross at the top of the steel tube. The gland, of course, is eased off in order to allow the tube to slide down the rod easily. The inflation proceeds until the desired pressure, as shown by the gauge, is reached. We find a suitable air pressure to which the bags are inflated to be about 1½ lb. per sq.in. The steel rod provides a secure anchorage for the bag at the bottom of the main and the steel tube provides the same for the upper portion. It is practically impossible for the bag to move out of its position. The completed operation of bagging off the main is shown in fig. 4.

When it is desired to withdraw the bag, the hose connexion is attached to the suction side of the pump, and the relief cock on the cross is opened. The air inside the bag begins to escape through the opened relief cock, and deflation is assisted by the gas pressure on the exterior of the bag. It is found desirable to complete the deflation of the bag by closing the relief cock and operating the pump, which is now acting as a suction and not a pressure pump. During deflation, the cross is drawn upwards along the steel rod until the bag resumes the extended condition it was in before insertion into the main. The bag can now be withdrawn with the same ease as it was inserted. The wooden plug is, of course, still used to prevent excessive escape of gas during this operation, as in the other.

Upon complete withdrawal, the valve is closed and the cap is replaced on the top of the stand pipe.

Gas Undertakings' Results

Gas Supply Company.

We have received the Directors' report and statement of accounts for the year ended June 30 last which were submitted at the twelfth annual general meeting of the Gas Supply Company, Ltd., an undertaking with headquarters in Melbourne which, as stated in the "JOURNAL" Calendar and Directory, supplies gas to nine towns in New South Wales, Queensland, and Victoria. Satisfactory progress is being made, the amount of gas sold showing an increase of 8·3% over the preceding year. New services laid numbered 527, while 2,141 new appliances were connected. Prospects for the current year, the Directors report, are equally good, but costs of labour and materials, which increased during the past year, still continue to rise. The dividend for the year is 5½%. A complete new carbonizing plant at Albury and extensions to the Mackay carbonizing plant were completed during the year. The compressing plant and two miles of high-pressure main at Cairns, as well as numerous main extensions at other branches, to meet the increased demand, were also completed.

Greenock.

The growing popularity of gas in Greenock for domestic and industrial purposes is reflected in the continued expansion of sales. An increase of 2%, or 18 million cu.ft. of gas, for the year ended May 15, 1938, brings the total sales for the year to the record high figure of 773 million cu.ft. There was a further net increase of 3,189 domestic gas appliances connected during the year so that the expansion in gas sales may be expected to continue. The gross revenue from the sale of gas and by-products was £110,324 —an increase of £5,257 over the previous year—while the gross expenditure was £93,679, or £1,915 up. After meeting interest and sinking fund charges, &c., of £13,269, there was a net profit of £3,392. At May 15, 1937, there was a balance of £4,375 at credit in the net revenue account; adding the £3,392 net profit made during the past year the total credit in net revenue account at May 15, 1938, amounted to £7,767. Of the surplus £2,000 is to be transferred to the Rate Fund, and in order to provide for retort renewals during the current year £5,000 is being placed in the reserve fund. The greatest quantity of gas sent out during the year over a period of 24 hours was 3,487,000 cu.ft., or 14,297 therms. The maximum 24 hours' make of gas was 3,220,000 cu.ft., or 13,202 therms. These returns are the highest ever recorded.

Johannesburg.

That the Department is maintaining its steady progress and expansion is stated by Mr. A. E. Brett, the Gas Engineer and Manager, in his report for the year ended June 30, on the operations of the City of Johannesburg Gas-Works. The quantity of gas manufactured was about 655¼ million cu.ft.—an increase of 55 millions, or 9·2% over the preceding twelve months. With a total revenue of £167,210, the net surplus for the year, after providing for interest and redemption of capital, as well as depreciation and all other charges, is £4,184. At June 30 there were 8,700 consumers, which compares with 7,085 at the end of the previous financial year. To cope with the steadily increasing demand for gas, the works at Cottesloe have been considerably extended during the last three years. The work undertaken has included the construction of a new gasholder, and extensions to existing holders, providing a total storage capacity of 3 million cu.ft. of gas. The carbonizing plant has been increased to three times its original size, and is now capable of producing 4½ million cu.ft. of gas a day. In addition, the original carbonizing plant, constructed in 1928, has been re-conditioned. It is anticipated that these extensions, which are now completed, will satisfy the gas and coke requirements of the city for some years to come.

Stockport.

The quantity of gas sold during the financial year ended March 31 last by the County Borough of Stockport Gas Department was 1,226,383,200 cu.ft. This was an increase of 5,623 200 cu.ft., or 0·46%, over the quantity sold in the preceding twelve months. A balance of £21,133 is carried to Net Revenue Appropriation Account, from which some revenue contributions are made to capital outlay, and transfers of the sums of £11,000 and £5,500 respectively are made to the Income-Tax Reserve Fund and the Retorts Renewal Account. Of a total expenditure on Capital Account amounting to £1,193,155, the net outstanding debt now figures at £348,260, which is equal to £259 17s. 11d. per million cu.ft. of gas made. In order to meet market conditions for coke, the gaseous yield of therms per ton of coal carbonized, at 78·09, has been less by 2·45 therms than in the previous year, while, on the other hand, the production of coke per ton of coal has been 11 cwt. 1 qr. 15 lb., as against 10 cwt. 0 qr. 26 lb. During the twelve months the number of consumers increased by 2,680 to a total of 51,484, of whom 30,034 are supplied through prepayment meters. An agreement was reached during the year with the Hyde Gas Company in regard to that portion of the Bredbury area where overlapping by the two undertakings was taking place. Under this agreement 578 consumers were transferred from Stockport to Hyde, and 66 from Hyde to Stockport. An appropriate financial adjustment was made, under which Stockport received £6,249. The gas sold for industrial purposes during the year, at about 244 million cu.ft., showed an increase of nearly 21½ millions.

(For further Gas Undertakings Results see p. 574.)

A New Gas Fire

Incorporating the Principles of Radiation and Convection

The principle of combining in one unit the functions of a flued hearth type gas fire and an air heater is not new, but previous designs have usually failed to satisfy at least one of the following conditions: (1) High convector efficiency; (2) simplicity and robustness of construction; (3) minimum effect of flue pull on overall efficiency; (4) a unit very little larger than a normal gas fire with the same number of radiants.

Considerable research work has been necessary to perfect the new "C-R" fire—a product of General Appliances, Ltd.—and the result is claimed to be a unit satisfying these conditions.

The increase in efficiency has been obtained by utilizing the heat in the products of combustion leaving the tops of the radiants and, by means of special construction, reducing to a minimum the heat loss from the back of the fire. Due to the fact that no moving parts are involved and all surfaces in contact with the products are amply protected, the maintenance of a "C-R" fire is no more than that necessary for a normal gas fire.

The overall efficiency of the "C-R" fire is stated to be 70%.

The proportion of convected heat to radiant heat emitted by the fire is such that comfortable conditions can be established with the air temperature at about 55° F.

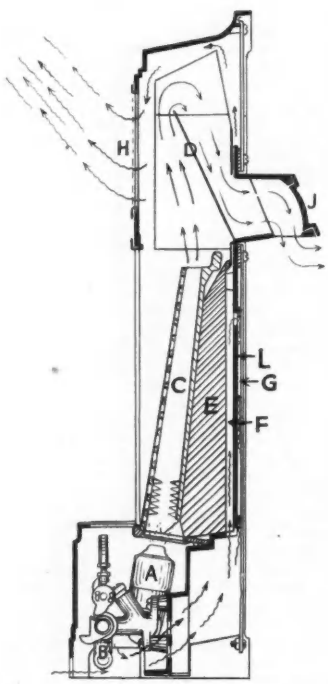
Right or left hand gas connexions can be made over the hearth, and a hole is provided in the back sheet through which a concealed connexion can be made.

The gas rate control has been designed to eliminate as far as possible the uncertainty regarding the actual gas consumption which results from the use of an adjustable injector and a pressure control. A fixed injector, a pressure test point, and a pressure control are fitted.

A screw choke is provided in the burner throat by which the length of the inner cones can be increased to about ¼ in. if the aeration is excessive.

The automatic ignition is of the familiar flint on steel type with a special double pilot and shield. This method of construction gives reliable ignition during the whole life of the flint. The spring loading on the flint gives a practically even pressure whatever the length of the flint, and no adjustment is required. Sufficient flint is carried to give at least a thousand ignitions.

The Heating Unit.—The radiants C (see sectional diagram) are fitted closely against a smooth firebrick back E of low thermal conductivity, and are heated by a burner of normal type with refractory nozzles. The hot products of combustion from the tops of the radiants pass into the special convector box D and finally pass into the flue through the nozzle J. Air from the room is drawn in at the base of the fire and passes between the brick and the cast iron frame, and between this frame and the sheet metal back, travels over and around the convector box, and finally passes into the room through a chromium plated grill.



The "C-R" Fire.

The convector box is given a special heat-resisting and corrosion-resisting treatment, during which the box is stoved at 500° F.

In order to obtain the highest possible overall efficiency, it is necessary to reduce to a minimum the amount of heat lost from the back of the fire. The air spaces F and G are maintained by means of studs cast on the frame L. This frame is finished in aluminium paint to reduce the heat loss by radiation, and a sheet of asbestos reinforced aluminium foil is placed in the position shown on the diagram, still further to reduce the radiant heat loss.

In practice, the average surface temperature at the back of the fire is about 50° F. above air temperature, corresponding to a heat loss of only 2%.

Conducted heat from the convector box to the cast iron frame, and from the frame to the sheet back, is eliminated as far as possible by asbestos gaskets, which also serve to maintain the joints practically airtight and prevent the possibility of excessive flue pull affecting the air flow over the convector box.

Special Flue Nozzle.—To minimize the effect of chimney pull on the efficiency, a special flue nozzle is used, and the sides of the fire are cut away so that when the fire is in position against a surround small gaps are left at each side. The effect of chimney pull is to draw air from the room through these gaps, while the special nozzle ensures that the amount of excess air drawn through the convector box is kept as low as possible. This device obviously does not give perfect control, but no moving parts are involved and no maintenance is required.

Performance Figures.

The fire will be available initially only in one size—6 radiant—but two sizes of radiants are made—these being (1) 11 in. long, known as the long radiant; (2) 8½ in. long, known as the short radiant.

We are informed that at a later date it is proposed to manufacture a 9 radiant size, which will also take long and short radiants.

Actual test figures for heat balances of the fire fitted with the two sizes of radiants are as follows*:

	6 Radiant Short.		6 Radiant Long.	
	B.Th.U./Hr.	%	B.Th.U./Hr.	%
Heat output as—				
1 Radiant heat	4,040	45·0	6,200	46·0
2 Convected heat from front surfaces..	100	1·1	160	1·2
3 Convected heat from box	2,060	22·9	3,210	23·8
Total	6,200	69·0	9,570	71·0
Heat loss from back of fire ..	200	2·2	270	2·0
Heat in products of combustion	2,600	28·8	3,660	27·0

The average temperature of the air issuing from the grille is about 250° F. above the temperature of the air in the room, and the volume of air heated is of the order of 700 cu.ft. per hour.

Of the steady heat output 50% is obtained in 3 minutes and 90% in 23 minutes, but 90% of the steady radiant heat output is obtained in 14 minutes.

The gas rate can be reduced to about 65% of the recommended rating without serious loss in efficiency.

Ventilation.

Owing to the small amount of heat passing into the flue from the convector box, the ventilation with the "C-R" fire is not quite so pronounced as that with the normal hearth type gas fire. However, an additional air movement, equivalent to about 1½ air changes per hour, is normally obtainable.

Effect of Flue Pull on Efficiency.—When the fire is fitted to a 15 ft. flue having an area of 36 sq.in., the overall efficiency drops to about 63%; the radiant efficiency is practically unchanged; the convection efficiency falling to about 17%.

Heating Capacity.

The heat requirements of a room depend on a number of factors: type of construction, aspect, degree of ventilation, occupancy factor, &c., and an accurate estimate of the size of fire required can be obtained only by taking all these into account. As a rough guide, however, the following figures can be used:

1. For continuous heating—that is, for daily periods of not less than about 5 hours, or where a heating-up period of about ¾ to 1 hour before occupation is permissible:

   The fire with short radiants is suitable for rooms up to 1,600 cu.ft. capacity
   „ „ „ long „ „ „ „ „ „ „ „ 2,800 „ „

2. For intermittent use—*i.e.*, where the fire is required to give comfort reasonably quickly in cold weather:

   The fire with short radiants is suitable for rooms up to 1,100 cu.ft. capacity
   „ „ „ long „ „ „ „ „ „ „ „ 1,800 „ „

With gas at 9d. a therm, the fuel costs of the "C-R" fire can be as low as those for solid fuel fires for periods up to about 5 hours. With gas at 4d. a therm, however, the cost is always lower than that of solid fuel, even for continuous heating.

* These figures are laboratory results on fires without any flue attached.

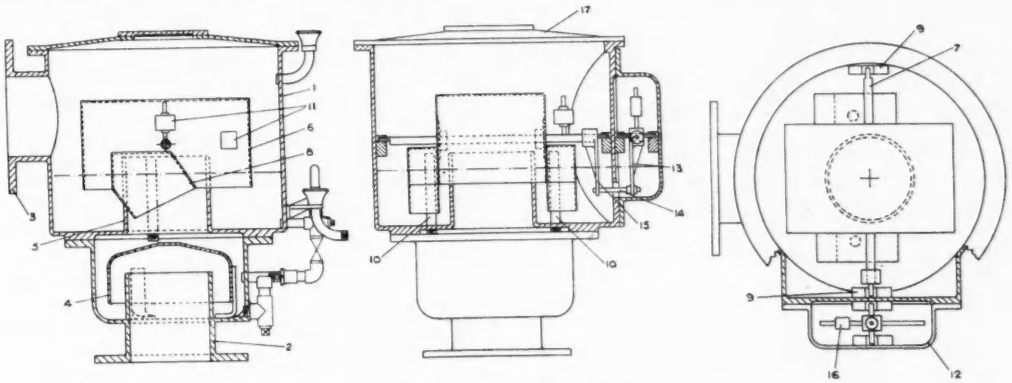
Braddock's Relief Valve for Foul Mains

The need for additional safety in gas manufacturing plant is increasing in importance, and a safety valve allowing the release to atmosphere of any undue pressure which would build up in the foul main in the event of the exhausters failing or being stopped, provides a safe insurance against accident to both the plant and its staff.

The following is a description of such a valve, the principle of operation following straightforward lines and the construction of which is compact and robust.

To enable the description to be followed more readily references are made to the section, elevations, and plan.

The valve consists of a cast iron tank 1 having a vertical inlet connexion 2 at the base and a horizontal outlet connexion 3 at the side. In the inlet connexion is arranged a water seal 4 to be used only when it is necessary to isolate the relief valve from the foul main for cleaning purposes. From the seal the inlet connexion rises in the main tank with a vertical passage 5 to a point above the level of the sealing liquid which is water with a layer of oil. This inlet passage is covered by a valve in the form of a bell 6 fixed to a shaft 7. At the sides of the centre valve are attached two bells 8 which act as controls. The shaft rests in knife-edge bearings 9 at each side of the tank. The centre valve is equally disposed on each side of the shaft so that it is balanced against gas pressure.



Braddock Patent Relief Valve.

The control bells 8 are situated on one side of the shaft and receive the pressure from the inlet side of the valve by means of two vertical pipes 10. These bells are always sealed by the liquid.

The valve and bell unit is balanced by means of weights 11 fixed to the sides of the tank and to the shaft.

On the outside of the main tank and opposite the bell shaft 7 is fixed a small seal tank 12 enclosing a lever 13 supported on knife edges. A hole in the end of the main tank communicates with the seal tank so that the sealing liquid reaches the same level in both tanks. This hole is large enough to allow the movement of a peg 14, on the lower end of the lever 13, which passes through the hole and fits into a slotted projection 15 on the valve unit. This lever has an arm carrying an adjustable weight 16 and forms the means for keeping the valve closed until the gas pressure acting under the control bell is ufficient to overcome this counterbalance and turn the valve to the open position. By moving this weight to or from the centre the gas pressure required to open the valve will be automatically reduced or increased.

The unit is enclosed by a cover 17 bolted on to the top flange of the tank. Provision is made for maintaining the level of the sealing water in the top tank, and also for flooding the water valve in the inlet by drawing off the water in the top tank.

This relief valve must be placed between the retorts and the retort house governor so that it is not affected by fluctuations in pressure from the exhausters. In operation, the valve remains closed under the normal conditions when the gas pressure in the foul main is governed to give either a slight vacuum or level gauge. Should the exhausters fail or be stopped through some cause or other, then the pressure in the retorts and the foul main gradually builds up until, acting under the control bells, it is sufficient to overcome the loading of the counterbalance weight and turn the valve unit about the bearings so that the edges of the valve come above the level of the liquid and allow the gas to escape through the outlet connexion to the atmosphere.

On return to normal conditions the pressure under the control bells drops and the counterbalance weight brings the valve back to the closed position again, thereby sealing the main from the atmosphere.

By altering the position of the counterbalance weight the valve can be set to release the gas at any differences in pressure between 1/10 in. and 3/10 in. water gauge. This range of differences in pressure will cover all conditions likely to be encountered in coal carbonizing plant.

The outstanding features of the valve are: Positive in action; no metal seated valves or stuffing boxes to cause sticking or leakage; combined water seal isolating valve; top cover can be removed and valve withdrawn without disturbing any connexions; can be conveniently tested at any time by altering the loading of the retort house governor; having a layer of oil on the water guards against corrosion; compact in size, allows plenty of choice for position.

Glasgow Rejects Coke Oven Gas Offer

Glasgow Corporation on Nov. 10, by 58 votes to 47, rejected the proposal by Messrs. William Dixon, Ltd., for the supply of gas from the firm's coke ovens.

Councillor Victor Warren, who favoured the proposal, said that the question of taking gas from industrial firms had been before the Corporation on June, 1934, March, 1935, and March, last year, and on each occasion the question had been treated on purely political grounds. The economics of the matter had never been properly examined. One of the greatest problems which faced the Corporation in the consideration of the offer of Messrs. Dixon was caused by the Trade Unions. He appealed to the Gas Committee to consider the question from a wide standpoint. Bailie Hugh Campbell warned the Corporation that the Government was quite alive to the hostility which was evident in the Corporation towards the development of private enterprise, and he added that it was not likely the Government would view too favourably the establishment of new industries in an area where local authority was showing hostility to private enterprise. Mr. K. Muir-Simpson expressed the view that the acceptance of the proposal would be a boon to the City by providing a reduction in the price of gas. The price of Dixon's gas, after allowing for the necessary expenses, would be 9½d. into the holder, as compared with the Corporation's price of 1s. 1½d. into the holder.

Speaking against the proposal, Mr. Alexander Munro replied that no case had been made out for taking supplies of gas from the firm. He considered that acceptance of the proposal would result in a loss of money and an insecurity of supply. Dalmarnock and Tradeston Gas-Works would require to be shut down. Mr. Thomas Wilson, Convener of the Gas Committee, argued that the proposal was far too vague. As regards a reduction in the price of gas they would require 20 million cu.ft. daily before any appreciable difference could be made in the cost to the consumers.

MR. RALPH HALKETT SPEAKS TO JUNIORS

ON

Matters of Importance to the Industry

A talk given by the General Manager and Secretary of the Sheffield and District Gas Company to members of the Yorkshire Junior Gas Association at their Annual Meeting held at Leeds on Oct. 29.

It is a pleasure to me to have this further opportunity of meeting the members of the Yorkshire Junior Gas Association, particularly as Mr. Wylie, who as you know is the Chief of my Sales and Fittings Department, has been chosen to be your President during the coming year. I was closely associated with Mr. Wylie for some time before he came to Sheffield, and I have always known him to be a hard working, helpful, and conscientious official. From my experience of him I am sure you will find him an ideal President, and I would like to take this opportunity of wishing him a very successful year of office. This is the third occasion on which a member of my Staff has been elected to the Presidential Chair, and this fact adds to the pleasure I feel in addressing you this afternoon.

During my career in the Gas Industry I have, as you may imagine, seen many changes in policy and methods of production, but it is gratifying to me to find that there exists among your members to-day the same spirit of enthusiasm and optimism as has always characterized the Association's activities. If you can keep this spirit alive, and if possible increase its intensity, you will have gone a long way towards ensuring the continued success of the great and important Industry to which we are all proud to belong.

The Gas Industry has stood the test of well over a century of time, and the remarkable progress it has made, particularly in the years since the Great War, is to a large extent due to the good work carried on by Associations such as yours, and this progress will, I am sure, be maintained if each member of the Industry will at all times pull his weight. In order to meet the keen competition with which we are faced, and which is certain to become keener, there must be no standing still, but rather a constant alertness and an earnest endeavour to develop more fully our business abilities.

My intention this afternoon is to forego the more formal kind of address to you, and instead have a brief talk on one or two matters which I consider are of some importance to our Industry.

Most of us here find it necessary to devote a considerable amount of our energies to questions affecting production, but the pressure of competition and the rapidly changing conditions in which we find ourselves are the reasons why I feel tempted to ventilate a subject which is not usually broached at a meeting of this kind.

The Need of To-Day.

Some short time ago Sir Frederick West, in his Lecture to the North British Association, gave us a very pointed interpretation of the attitude of the man in the street to our Industry. Most of you will probably remember that he quoted the example of the young university graduate who felt that he had lost caste on choosing the Gas Industry for his career. We in the Gas Industry do not share this feeling, and we must refute this attitude on every possible occasion.

It is quite evident that anyone holding such an opinion has not the slightest conception of the training required to enable a man to take up a prominent position in our Industry, and it is a fact that the Gas Industry to-day calls for the highest degree of technical skill and administrative ability in its chief officials.

Sir Frederick's remarks have confirmed what has been in my mind for some time. I feel sure that those outside the Industry are not aware of the varied positions and the opportunities offered by the Gas Industry, and I know of no other Industry that holds out better prospects for the right class of man.

Another point which affects the whole situation is the salary offered when a post becomes vacant. Is this always sufficiently high to attract the best type of candidate, and is the remuneration paid to the heads of gas undertakings adequate for the services given? I do not intend in this Address to discuss the question at length, but I do think that the matter is of paramount importance and should receive consideration if we are to hold our own among the other great industries of the country. Unfortunately, I am afraid serious appreciation of this subject is sadly lacking in the Gas Industry generally, and unless it is approached with as little delay as possible and tackled with due regard to its importance, the Industry cannot hope to induce the best brains to its ranks.

In this age of showmanship and the art of putting things over I am afraid we are still somewhat old-fashioned. We are one of the largest industries in Great Britain, and we should see that our method of approaching the general public, whose servants we are, is on thoroughly up-to-date and convincing lines.

Let me pursue this subject a little further. The vast majority of us, if we were honest about it, would admit that we admire the man who has tone and bearing. This has nothing to do with being objectionally superior. It has everything to do with the man himself and the people he meets. The point I wish to make here is that the time has come for us as individuals to give the public a better impression of us than they now hold.

Let us give tone to this great Industry. By our appearance, our manner, and the service we offer we can each create the atmosphere which nowadays is commercially so important, and then no young man need ever think he might lose caste by joining us.

It is my considered opinion that to-day there are wonderful opportunities in the Gas Industry for the young enterprising man who aims at the higher executive positions. There is now, and there will be in the future, endless scope for men with fertile brains who can adapt themselves to quickly changing conditions. Remember, we live in an age of speed and increasing competition. Knowledge, backed up by resourcefulness, adaptability, and a capacity for having the courage of one's convictions are the qualifications which in my opinion the young aspirant needs. I would also urge upon him the increasing necessity for acquiring a commercial outlook.

Managerial Responsibility.

Managerial responsibility to-day is more than ever concerned with profitable disposal of the products of manufacture. And I repeat that in my opinion commercial training and the commercial outlook are absolutely essential to those who in the future will control the destinies of the Industry.

I am not unmindful of the necessary functions of the engineer and the technical man, and, indeed, the Industry owes a great deal of its success to the work done by these specialists. Specialize by all means, but to those who are aiming for the higher posts I would say, study commercial practice as well.

Commercial training helps you to cultivate a clearer vision. It enables you to view a problem from all angles. It gives you the right sense of proportion between production and sales at a profit. Do not misunderstand me; *practical knowledge is the first essential and it should be the foundation of everyone's training.* If the man in charge is familiar, through personal experience, with the numerous practical and technical problems that arise in the course of a day's work, he obviously enjoys a big advantage. His opinion and advice naturally carry more weight, and the relation between himself and his subordinates is on a much surer footing.

The administrator with practical knowledge knows where to look for the weak spots. He knows the cause and how to deal with it. Many a balance sheet has been wrecked through leakages that no one dreamed of until it was too late.

Let me revert to my earlier remarks and say, do what you can to create the tone and atmosphere which are so hard to

define but which have such a powerful propaganda value. It should be the aim of everyone in this room to remove the reason for any hint that a man should lose caste by joining us. There is a great future in front of the Gas Industry, and it needs the best brains available—nothing less.

Intelligent go-ahead men like to mix with other intelligent and go-ahead men, and it is within our power to make our Industry an interesting and attractive career for the most enterprising of young men.

Smoke Abatement.

I now want to change the theme of my Address and take advantage of this occasion to say something about the Smoke Abatement Campaign which is now in full swing. I hope you will not mind if I say that in Sheffield we know more about smoke abatement and its relation to the Gas Industry than any other undertaking in the country.

On my staff are men with a specialized knowledge of the subject, and indeed two officials were solely engaged in scientific investigations for the Sheffield Steel Manufacturers Smoke Abatement Research Committee before I appointed them to positions with the Company a few years ago.

The substitution of gas for raw coal in Sheffield during the last few years has brought about a revolution in the steel trade of the City, and it is no longer correct to say that local industry is solely responsible for what dirt there is in the air at present.

The domestic chimney is the real culprit without a doubt, and I welcome this B.C.G.A. campaign to clear the air of impurities caused by the wasteful burning of raw coal in the domestic fireplace. It is very good business for all of us actively to co-operate in the scheme. It forcibly brings to the notice of the public our importance as a social service, and for that reason alone it is excellent propaganda.

A great deal of time and thought is devoted to the preparation of these campaigns, and I hope you gentlemen will appreciate the difficulty in preparing a plan that can be used by seven or eight hundred gas undertakings all over Great Britain. I know from experience the value of publicity of all kinds. In Sheffield we exploit all the B.C.G.A. propaganda campaigns to the fullest extent—and, let me add, it pays us well. I could find plenty of reasons for criticism, but I bear in mind that their objective is to keep gas service in front of the public. Therefore I appeal to you all to do what you can in your respective spheres to keep your consumers well informed of where the Industry stands and what it can do for them. The abolition of smoke from our midst would do as much for the improvement of public and individual health in our cities as any other single action open to this country.

New Thought and Endeavour.

I would also emphasize the necessity for new thought and endeavour to retain public opinion in our favour, and the scope that exists for the person who can plan original and profitable selling schemes which will meet the popular taste and appeal to all concerned.

Just before coming along to this meeting I was advised that my Company had achieved up to last week a 72% increase in the sale of washing machines over the same period last year. When I tell you that electricity is sold in Sheffield at one-third of a penny per unit—the cheapest in Britain—you will have some idea of the competition we have to face, but perseverance and tact bring in the results.

While on the subject of gas appliance sales, I would like to take the opportunity of pointing out to you that my Company's policy is to ask a reasonable price for every appliance sold. I doubt whether we could substantially increase our sales by cutting prices to an almost profitless level, or by introducing a long term simple hire arrangement. I know there is violent conflict on this matter, but I am convinced that it is bad for the Industry's finance and prestige to descend to a policy of almost giving goods away.

Manufacturers spend considerable time and money in offering a useful range of appliances for our consumers, and those appliances are either worth a reasonable and profitable price or they are not. We do not deserve to survive if we cannot honestly command a reasonable price for modern gas appliances. Wholesale and unprofitable distribution of appliances always looks to me like an act of desperation. It certainly is not salesmanship.

I abolished simple hire soon after I took over the management of the Company. Every appliance sold by the Company is a fair purchase on the part of the consumer. Four years is the limit of our hire purchase transactions. I believe that from every point of view this is the best policy. The consumer pays a fair price and gets a scrupulously fair deal. The appliance eventually becomes the consumers' own property, and the sales staff have the satisfaction of knowing that a genuine sale has been made. Incidentally, the problem of "returns" is almost non-existent at Sheffield.

There are few other undertakings in the country which have to face such formidable competition as we in Sheffield have to meet. As I have previously indicated, the municipality is now supplying electric current at the rate of three units for a penny. Despite this fact, however, I am pleased to say that the Gas Industry in Sheffield has been able to hold its own, and I consider that the prices charged in Sheffield both for gas and for appliances are equitable from the consumers' as well as from the Company's point of view.

Our Industry can do with plenty of men who can evolve not only original selling schemes but schemes that when in operation will show a reasonable profit. I have no doubt there are many among you in this room who have ideas which, if they were developed, would lead to improvements in some particular branch of the industry, but for some reason or other you are hesitant about using or suggesting them. These ideas may be quite workable and could doubtless be used for the common good. So I would say to you, don't be afraid to give expression to your ideas—they may prove very valuable to the Industry.

Time does not permit me to place before you the intricate details attendant upon the inauguration of my Company's Coke Oven Gas Grid, but I can tell you this. I had an idea, which involved risks, and I had to stand or fall by my idea.

I considered that in the interests of progress the risks were worth taking, and the answer is in the results achieved—an increase in the annual output of gas from 5,000 million cu.ft. to 10,000 million cu.ft. in considerably less than 10 years. I think it has been proved that my Company's venture has been successful.

The potential field in this direction is still unlimited. No doubt you will be aware of the developments in this direction in other parts of the country, and I am confident it is a step in the right direction, and will not be regretted.

The policy of providing a supply of gas for industrial purposes at reasonable rates will have far-reaching effects, and it is pleasing to find on every hand the assurance that results obtained in the heat treatment of all types of metals by the use of gaseous fuel are not only satisfactory, but output is guaranteed and the quality of the product is sustained.

Costing.

Before I close there is just one other matter I should like to mention briefly, and that is the question of costing. I consider that it is highly important for all gas undertakings, municipal or company, whatever the size, to have a regular system of arriving at their costs.

There should be no difficulty whatever in instituting a suitable system, and once it is in operation the chief of the undertaking is enabled to see at a glance where the weak spots are, and to ensure that there is no leakage or waste in the methods of working. A really efficient method of costing is therefore necessary if you are going to work your undertaking successfully and provide a supply of gas at a competitive price.

And now, gentlemen, I woud like to summarize my Address and ask you to fix these thoughts firmly in your minds.

First of all, the urgent need that exists for destroying the impression among the general public that we as an Industry are old-fashioned.

Secondly, the necessity for developing new and attractive ways of disposing of our products, including service to the consumer, and having the courage to translate these ideas into profitable action. Never mind the critics. If any of you feel a genuine desire to do something new, don't hesitate to give it full expression. You'll be surprised how determination helps you to ignore the uninformed critics. And remember this—history teaches us that the minority is eventu-

ally proved to be right. You will doubtless provoke opposition, but originality is seldom popular.

Thirdly, widen the scope of your outlook by taking more interest in commercial practice. If the Gas Industry is to go ahead you must find time to do this. We live in an age when powerful influences from other trades encourage the fickle public taste. Change is the order of the day. Whether we like it or not, we are compelled to face it, and only an industry well equipped with mental agility can hope to keep in front.

Vote of Thanks.

Mr. E. R. B. FRENCH (Leeds), proposing a vote of thanks to Mr. Halkett, said that gentleman was an old friend of the Yorkshire Junior Association, and they had much for which to thank him, quite apart from an excellent and encouraging address that day. The Yorkshire Association was particularly fortunate in the friendship and support of the Senior Engineers and Managers. Mr. Halkett was the administrative head of an undertaking which in some ways was unique and which they all greatly admired for the progress it had made under his guidance. Mr. French said he had been particularly impressed by the kindly manner in which Mr. Halkett's Address had urged on young men in the Industry the necessity to be loyal in their support and that their theme should be pro-gas rather than anti-electricity. Their Industry and its service were good enough on their own merits without decrying any other. It was an Industry of which every man in it could justly be proud.

Mr. J. W. WOOD, M.Sc. (Leeds), seconding, said as an older member of the Yorkshire Junior Association he could support Mr. French in his remarks on the many occasions on which Mr. Halkett had been of help to them. Mr. Wood said he would like to stress another aspect of that helpfulness, and that was the facilities that had been made possible by Mr. Halkett's assistance not only for members to see something of the wonderful gas undertaking itself at Sheffield, but the opportunity of visiting some of Sheffield's great industrial undertakings in which gas was used to an extent quite beyond the normal experience of people in the Gas Industry in general. It was gratifying to recall, also, that quite a number of members of the Yorkshire Association had secured valuable appointments under the Sheffield Gas Company.

Mr. G. E. CURRIER (Bradford) said he would like to support the tribute to Mr. Halkett's Address that day. He felt it was one which would be quite as suitable for a meeting of the Seniors' Association as for the Junior Association. They were all facing serious competition to-day and could do with all the encouragement and inspiration they could get. Mr. Currier was quite sure, however, that they could face the issue with confidence because their Industry—though no doubt there was plenty of room for improvement—had attained, by its service and recognition of its importance, a much better status in the public mind than perhaps existed some years ago.

Mr. R. N. WEBB, also supporting the vote of thanks to Mr. Halkett, said every word of the inspiring message must tell its tale to the young men who had heard it, and its portent, one hoped, would have an important influence for good on their future. Mr. Webb, who said he was convinced there was ample opportunity for more expansion of the Gas Industry in spite of all forms of competition, mentioned that though he had retired from daily service in the Industry, his contact with it was not at an end. He had been appointed one of the B.C.G.A. lecturers to visit high schools and secondary schools, preaching the message of gas service. The sooner they could impress on the rising generation the desirability of abolishing the coal fire, with its dirt and smoke and waste, the better for the people and for the Gas Industry. It was high time the people were made to realize that the housewife who desired gas fires did not do so because she was too lazy to deal with the old coal fire, but from vastly more important and essential motives.

Mr. HALKETT, replying, said he had never forgotten his own days as a member of the Yorkshire Junior Gas Association, and he was gratified to see present that day old colleagues of his membership days in Mr. E. J. Sutcliffe and Mr. Webb. Juniors must always keep in mind the fact that they were each a link in the chain of success. They had made progress in Sheffield because they had the team spirit, and that was the spirit which, permeating the Industry, would enable it to meet all difficulties and problems of the future.

Yorkshire Junior Gas Association

Annual Meeting

The 35th Annual General Meeting of the Yorkshire Junior Gas Association was held on Oct. 29 at the Fuel Department of Leeds University—Mr. J. RICHMOND (York) presiding at the outset.

Mr. RICHMOND extended a welcome to the visitors, and also to new members elected to the Association since the last annual general meeting, after which the Report and Accounts were adopted on the motion of Mr. A. WILKINSON (Huddersfield), seconded by Mr. G. FITTON (Dewsbury).

New Officers.

The following officers and Council were elected:

President.—A. Wylie (Sheffield).

Senior-Vice-President.—T. G. Lewis (Leeds).

Junior Vice-President.—F. Beaumont (Huddersfield).

Hon. Secretary.—R. H. McCulloch.

Hon. Treasurer.—T. Hayes (Leeds).

Hon. Auditors.—J. R. Firth and A. W. Arnold (Bradford).

New Members of Council.—E. Bailey (Cleckheaton), J. A. Derbyshire (Bradford), J. R. Firth (Bradford).

District Education Committee Representatives.—A. H. Clucas (Leeds), G. Griffiths (Bradford), A. Pickard (Knottingley), and A. Wilkinson (Huddersfield).

Honour to Mr. R. N. Webb.

Before vacating the Chair, the retiring President (Mr. Richmond) reported a unanimous recommendation of the Council that Mr. R. N. Webb, of Leeds—one of the original members and a Past-President of the Association and recent President of the Manchester Senior Association, be made an honorary member, in appreciation of his many years' service to their Association. Mr. Webb had lately retired from active participation in the Industry, and they would all wish him many years of happiness in retirement.

The meeting unanimously approved the recommendation.

Mr. WEBB, in acknowledgment, said though he had retired from daily work in the Industry, his interest was still there and he hoped to continue to be of some little service to the Industry he loved and to the Association with which he had been connected from its inception. When invited to accept this honour he had wondered for a moment whether to do so or to continue active participation in the work on which he had been engaged latterly—particularly that of the Education Committee; but he felt he would be doing the Association itself a service by making way for a younger man. To one who had given a good deal of time and effort in the Association's affairs it was gratifying to know that there were plenty of young men available to take up any such work. Mr. Webb said he had no hesitation in acknowledging that his membership of the Association from its start in 1903 had been immensely beneficial to himself and had a great deal to do with his progress in the Industry and with his reaching the Council and the Presidency of the Seniors' Association at Manchester.

The new President (Mr. A. Wylie), after thanking the members for their confidence and assuring them that he would do his utmost to uphold the tradition established by his predecessors, presented to Mr. Richmond the customary Past-President's Medallion, with an expression of appreciation of his services in the Chair.

Mr. RICHMOND, in reply, paid tribute to the support he had received from the Council. Mr. Richmond said he desired also, on behalf of the Association, to acknowledge with thanks the helpfulness of members of the Senior Association and Chiefs of Yorkshire undertakings for the interest they took in the Association's activities and the facilities granted in many ways. He also thanked those who had contributed Papers, and wished particularly to thank the Directors of the York Gas Company and his own Chief, Mr. Bloor, for facilities which had enabled him to carry out the Presidential duties during the year.

On the motion of Mr. S. DAVIES (Sheffield), seconded by Mr. A. W. REID (Leeds), a hearty vote of thanks was accorded to the retiring President, officers and members of Council for their services.

Mr. RALPH HALKETT (General Manager and Secretary of Sheffield Gas Company) then gave an Address to the Association. This will be found on other pages of this issue.

The PRESIDENT extended the Association's good wishes to Mr. Webb in his work as a B.C.G.A. lecturer to schools. Mr. Wylie also extended a warm welcome to Professor Townend, successor to one to whom the Association owed a great debt of gratitude for long friendship and helpfulness—Professor Cobb.

Professor TOWNEND, replying to a vote of thanks to the University Authorities for the facilities for the meeting—moved by Mr. A. PICKARD (Knottingley), seconded by Mr. A. P. JENNINGS (Leeds)—said he was conscious of the signal honour which had

been conferred on himself by appointment to the Livesey Chair of Coal Gas and Fuel Industries at Leeds, in succession to a man so distinguished as Professor Cobb in that work. He hoped he might be able to follow in Professor Cobb's footsteps worthily. He was glad of the opportunity of meeting the members of the Yorkshire Junior Gas Association and extending to them the welcome which they had had to the Department for so many years past. The address that afternoon had placed a high value on the tone and conduct of members of the Gas Industry and their associations, and he felt it was a message which they would all find helpful and useful.

The Clayton Award.

Mr. E. HARTLEY, of Clayton, Son, & Co., Ltd., was then called upon to present the Clayton Medal for the best Paper read before the Yorkshire Association during 1937. The recipient was Mr. H. Johnstone, of Bradford, for the Paper, "The Application of Materials to Gas-Works Construction." Mr. Hartley, after expressing good wishes to Mr. Wylie in his Presidency of the Association, said he had himself been in close contact with Mr. Johnstone during the past two or three years in connexion with the reconstruction work at the Birkshall Works, Bradford. He would have been glad enough to offer any information had it been asked, but Mr. Johnstone had undertaken the Paper—which related to some of that reconstruction work—as from his own observation and study of the subject and he (Mr. Hartley) had known nothing of its preparation at all. He felt perhaps it was desirable to mention this in view of his own connexion with the work involved in the Paper chosen by the Association for the Clayton award this year. Mr. Hartley felt Mr. Johnstone was to be heartily complimented on the Paper. To the younger members of the Association Mr. Hartley's message was "Never be afraid to put your knowledge and your thoughts into the form of a Paper. Doing that is an education in itself and is of as much benefit to yourself as it may be helpful to your fellow Association members."

Mr. JOHNSTONE, expressing thanks for the award, hoped the Paper might have been of some service. Members of the Association did not prepare Papers in expectation of material reward, but a medal like the Clayton Award was certainly likely to prove a further incentive to whatever motives already lay behind offers to prepare such Papers.

British Road Tar Association

Sir DAVID MILNE-WATSON, Bart., as President, gave an Address at the 11th Annual Luncheon at Grosvenor House, Park Lane, W. 1, on Nov. 3.

We here have all one aim in common—to improve the road system of this country, so that it will be fully adequate for the needs of our industrial and social life. Not only must we have sufficient roads to cope with the ever-increasing volume of traffic of all kinds, but we must have safe roads. Energetic action is required to reduce the appalling list of road casualities. Safety must always depend to a large extent on personal factors. This necessitates the education of all road users to a full appreciation of the risks which can never be entirely dissociated from speed and to the need for the utmost consideration for the safety of others. This is a problem outside our scope. At the same time there is a widely held view that a considerable percentage of accidents are due directly or indirectly to the deficiencies of our road system, whether they be associated with the general lay-out and construction of the roads or with the road surfaces. With this latter aspect we can do much to help, and have done so in the past.

Roads and Re-armament.

If we compare the road systems of different countries, we are bound to admit that the general lay-out of our main roads compares unfavourably with the best roads in Germany and America, but if we compare the roads as a whole, then I think many of the criticisms directed against this country are not justified. As far as road surfaces are concerned, we most certainly lead the world. But this is no reason for self-satisfaction. We must deal with the growing congestion of traffic and the high rate of accidents. We must therefore press for the improvement of our existing roads and for more roads, but, as I said last year, we should at the same time vigorously urge the adoption of a national long-distance policy for the co-ordination of road and rail, which will enable both to be developed to the national advantage, otherwise we shall be faced with uneconomic expenditure which we can ill afford.

The recent crisis has shown the vital urgency of our re-armament programme. If we are to be ready at all times to defend our Great Empire and the liberty which is our proud heritage, nothing must interfere with the completion of our defence plans. We all realize that as our financial resources are not unlimited re-armament must of necessity enforce economies in other directions. We hope, however, that no reduction will be made in the already inadequate funds allotted to road work, in view of the vital importance of a first-class road system in time of war.

In this connexion, the problem of making good the damage to roads should war occur must not be overlooked. I need hardly remind you that this country has within its borders adequate supplies of all the materials required. There is an abundance of roadstone all over the country, while the production of tar from our gas-works and coke ovens is also well distributed. It was one of our assets in the Great War that we were able to provide sufficient road tar to keep open the vital channels of communication at the Front. We should have no difficulty in meeting any demands on another occasion.

While I do not wish to harp upon the subject of war, the recent crisis showed the importance of having a road surface sufficiently dark to make observation from the air difficult. Tar provides such a surface. In the recent emergency it was found advisable to darken some of our lighter road surfaces as a precautionary measure by brushing them with creosote—a product which is also derived from tar.

Tar or Concrete?

Last year I referred to the German Roads Delegation and the strong representations that were being made to the Government for the construction of new motor roads on the German plan. We now know that the Government is not prepared to embark on such a scheme for the present, but we are glad to learn that plans are being made for a new £800,000 highway in the London area. There are many who advocate that only concrete be used for our new roads because of what Germany has done. They forget that Germany has had to use concrete as the main constructional medium as her economic system gives her no alternative. For the Germans, concrete is the only material available in any really large quantity. We are in quite a different position in this country. We have other materials at our disposal.

The Kingston By-Pass experiments have shown that several different types of construction, including tarmacadam, have so far stood up for eight years to a traffic of 17,000 tons per day, a most exacting test. Many of these materials are also attractive from the point of view of cost. If the results of such experiments are not to be used, why carry out the experiments at all? We feel that the best of them should be given an extended trial on our new roads, and sufficient length of road should be allocated to each type of material to encourage the development of rapid mechanical methods of construction. We have seen the great advances in the laying of concrete roads in Germany, and we are convinced that similar advances can be made in this country in the laying of other types of road, if those concerned are given a sufficient length of road on which to work. We therefore urge on the Ministry of Transport that the various methods of construction which have proved their value on the Kingston By-Pass tests, and are financially attractive, be given an equal opportunity with concrete to prove their efficiency and economy. The nation is bound to benefit from such a policy.

I feel sure that in making this plea, I shall have the full support of our bitumen colleagues and of the Roadstone Federations, whose Chairmen are with us to-day, and to whom I desire to express our appreciation of their willingness to co-operate with us in the solution of our common problems.

Progress through Research.

The main activity of this Association is research and experiment. For many years we have been co-operating with the Department of Scientific and Industrial Research in laboratory investigations at the Chemical Research Laboratory at Teddington and the Road Research Laboratory at Harmondsworth, in order to learn more and more about the properties of tar and the characteristics which make an efficient road binder when used in conjunction with the various types of road stones. The acid test of a binder must always be its behaviour on the road. We have therefore, since the Associa-

tion started, devoted much attention to practical road experiments in co-operation with the Ministry of Transport and surveyors in different parts of the country. As a result we have seen great advances in the quality of the tar and in the methods of application and use.

The work still goes on. We appreciate the steadily increasing severity of the stresses and strains which road materials have to endure from the growing volume, weight, and speed of traffic, and our objective is so to develop the use of tar that we are in a position to anticipate and provide for any demands the road engineer may make. A few years ago, surface-dressing was generally an annual occurrence; now it is possible to get a life of from three to five years from a good surface-dressing—a great economy indeed.

In this connexion, I want to stress the importance of technique and adequate supervision in the use of tar, and in fact of any binder. In addition to its accepted qualities as an efficient non-skid material, one of the great merits of tar is its flexibility. It can be used with ease under practically any conditions. Two years ago we laid a demonstration tarmacadam road in Scotland in very severe weather (there was snow part of the time), and the road is to-day in perfect condition.

This flexibility in the use of tar has at times acted to its detriment. The users have taken liberties with it which they would never have taken with a less flexible binder, and have at times got poor results, which they have attributed to the binder. The tar was not at fault—it was the method of application. Unfortunately in the case of failures, the tendency too often is to blame the binder and overlook the unsatisfactory methods of use. Full advantage of improvements in the quality of tar can only be secured if adequate attention is given to the methods of using it. Road construction and repair must now be regarded as a skilled operation requiring adequate supervision, and not just something that can be left to the ordinary working squads.

The same applies to the processes involved in coating stone for road construction. An important advance has been made by the recent issue of the first British Standard Specification for Tarmacadam. The initiative came from this Association which has been helped by the willing co-operation from the various institutions representing the road stone industries and road engineers and from the Ministry of Transport. The insistence on tarmacadam to this specification in all contracts will do much to raise the general level of quality and bring about the modernization of the plants, many of which unfortunately are not in accordance with present-day requirements.

A year or two ago, we saw the introduction of a new method of road improvement in the form of thin carpets, designed to restore the good riding qualities of a road which is otherwise sound. We have had, and still have, some doubts as to whether this method has any economic advantage over surface-dressing. A carpet is likely to cost from 1s. to 2s. per sq.yd., while a good surface-dressing carried out by modern methods, from which a life of three to five years is now obtained, costs about 3d. to 5d. On cost, therefore, a carpet would have to last at least ten years to make it as cheap as a surface-dressing. In spite of the apparent economic disadvantage, many surveyors find these thin carpets attractive, their viewpoint being that there is much less frequent dislocation of traffic for repairs with carpets than with surface-dressings. We have, therefore, made a special study of thin tar carpets in order to determine the factors which are essential in their design and construction. Our specifications have been accepted by the Ministry of Transport and are at the disposal of surveyors generally. They are based not only on intensive laboratory investigations but also on practical experience on the road over more than three years in different parts of the country. You will be shown shortly a film which we have prepared to demonstrate the salient features of tar carpets.

I have already referred to the great improvement in the quality of tar in the last few years. The result is that the existing British Standard Specifications are now out-of-date. The tar supplied is much better than these specifications require. We have given much attention to the problem of a new specification. We are particularly anxious that it should include tests which will indicate the characteristics of a tar necessary for an efficient road binder. As the result of co-operative work in several laboratories, a number of tests have been devised which, *prima facie*, appear to supply what we need. In order that any new specification may find ready acceptance by both the supplier and the user of tar, we must prove conclusively that these laboratory tests give results which are in conformity with the actual behaviour of the tar on the road. To this end we have this summer carried out an extended series of road trials with a wide range of tars. The test lengths have been laid under the direction of the Ministry of Transport who are co-operating closely with us in this development, and we wish to express our keen appreciation of their willing help in this and other directions. The outcome of the experiments, whatever it may be, is bound to bring about a still greater improvement in the use of tar in road construction. In this way we hope to extend still further the market for tar, which I need hardly remind you is an entirely home produced product and has a record of over 50 years' service as a flexible, efficient, and economical binder which will produce a road surface safe and comfortable to drive on under all weather conditions.

Had time permitted, I might have touched on other aspects of our work. I hope, however, I have said enough to demonstrate to you that the Association and its Members are engaged on work of the greatest national importance in that they are contributing to the progressive development necessary to ensure that as far as surfaces are concerned, our roads are the best in the world. The Association has now accumulated a great mass of data and experience in regard to the construction of tar roads, and the services of its staff are freely at the disposal of the road engineer and manufacturers of coated stone. We will welcome their enquiries and will gladly do everything we can to assist in the solution of their problems which are, after all, the problems of every road maker and road user.

Further Gas Undertakings' Results

Milnthorpe.

The 78th ordinary general meeting of the shareholders of the Milnthorpe Gas Company, Ltd., was held on Oct. 31, Mr. Laurence Nanson presiding. The Directors reported a satisfactory year's working, the consumption being well maintained. It was proposed to lay new mains in part of the town area to cope with increased demand. A 5% dividend was declared, and £100 was transferred to the reserve fund, and £200 to a bad debt reserve fund.

Stalybridge.

In the case of the Borough of Stalybridge Gas Department, the gas sold during the year to March 31 amounted to 162,342,900 cu.ft., which compares with sales of 161,490,100 cu.ft. in the preceding year—an increase of 852,800 cu.ft., or 0·52%. At the same time, there was a substantial reduction in the unaccounted-for gas—from 6·72% to 4·25%; the gas sent out having amounted to 169,561,941 cu.ft., as against 173,132,421 cu.ft. The quantity of gas used in the public lamps continues to increase, and so does the industrial consumption, including factory lighting. On the other hand, the domestic consumption decreased by nearly 9 million cu.ft., following a decrease during the year to March, 1937, of 12 millions. During the past twelve months 100 consumers have been lost. Of the total of 7,228 consumers, no fewer than 4,860 use prepayment meters—practically the same number as in the preceding year. The average consumption of all the consumers for the past twelve months was 22,460 cu.ft. In his report, the Engineer and Manager, Mr. R. S. Restall, deals with two of the points just referred to. Regarding the reduction in percentage of unaccounted-for gas, he says that many unsatisfactory meters have been removed and others tested *in situ*, and the work has resulted in a satisfactory reduction in the unaccounted-for gas. On the reduction in domestic consumption, he remarks: "The most serious aspect of slum clearance is the loss of gas consumption."

Sowerby Bridge.

The total quantity of gas sent out during the twelve months ended March 31 last by the Sowerby Bridge Urban District Council Gas Department was 221,739,000 cu.ft.—a decrease of 3,465,000 cu.ft., or 1·54%, on the output of the preceding year. An analysis of the figures shows that this decrease was entirely due to the relatively poor condition of trade in the district, the demand for industrial purposes having been considerably reduced. Actually, the gas consumed for domestic purposes shows an increase over the previous year. While during the year the total number of ordinary consumers fell from 5,613 to 5,431, prepayment consumers increased from 2,491 to 2,574. The average annual consumption for the ordinary consumers was 25,360 cu.ft., and for the prepayment consumers 20,401 cu.ft. Conversion of the street lamps from hand lighting to clock control has resulted in considerable saving in labour and gas, while the number of mantles used decreased by approximately 40%. New consumers include central heating by gas-fired boilers and a large installation of radiant panel heaters.

TRADE NEWS

What the manufacturers are doing by way of new and improved appliances, plant, and processes.

C.O.L. Intermittent Chambers for Vancouver.

Gas Chambers and Coke Ovens, Ltd., have just been awarded a third contract for C.O.L. Intermittent Vertical Chamber plant by the Vancouver Gas Department.

"Ewart" Bath Geyser.

Owing to the installation of new machinery at their factories, Messrs. Ewart & Son, Ltd., are able to offer their No. 25 geyser series at greatly reduced prices. The improved design of this type has enabled the firm to reduce substantially its external dimensions; the heater consequently is of extremely neat appearance.

Milnes All-Gas Radio.

We gave an illustrated description in the "JOURNAL" for Aug. 31 last of the all-gas radio put on the market by Milnes Electrical Engineering Company (Bingley), Ltd. The firm have now published an attractive and informative booklet dealing fully with their Thermo-electric Generator and Converter. Copies of this booklet are available on request at the firm's Bingley Office.

Gloves for All Industrial Purposes.

An extensive range of work gloves are made for all industrial purposes by Messrs. Tedson, Thornley & Co., Robert Street Mills, Rochdale. Literature recently published by them includes some of the many different shapes manufactured, and it is clear that special styles and sizes are available for every factory requirement. The firm also manufacture asbestos gloves and mitts for stokers and furnace-men, &c.

London Engineering Works' Extension.

For the fourth time during the last ten years, Messrs. G. A. Harvey & Co. (London), Ltd., have found it necessary to make a considerable addition to their works at Woolwich Road, Charlton, S.E. 7, and the latest extension brings the total area covered by their works up to 25 acres.

The new building, which is nearing completion, is a reinforced concrete structure of five storeys, 152 ft. long, 92 ft. wide, and 72 ft. 9 in. in height to the top of the parapet, with a total floor area of about 70,000 sq.ft. The building is an excellent example of the modern style in factory design and at the north and south ends an interesting effect has been produced by a perpendicular break in the horizontal run of the windows, these being glazed steel sashes. A siding connects the new building with the Southern Railway system and with a wharf on the River Thames.

Cannon's New Season's List.

A particularly attractive model in the new season's list of Cannon Iron Foundries, Ltd., is the "Virginia" fire, which incorporates automatic ignition; the control being on the canopy, any undue stooping when lighting the fire is obviated. The "Virginia" can be had with five, seven, nine, or eleven radiants.

The makers state that the introduction of the inclined radiants marked a great advance in gas fire design. By this means some of the heat formerly wasted on the hearth was added to the amount radiated horizontally and upwards. At an angle of 20° the radiants give out the best possible distribution in a vertical direction. The V-Inclined is an improvement on the earlier inclined fires. Not only is the "up-and-down" heat correctly distributed, but the "side-to-side" distribution is similarly improved. The inclined radiants are stepped back from the centre radiant, with the result that far more heat is radiated sideways, it is claimed, than in the case of the flat-fronted fire. It is also claimed that the amount of heat radiated from an inclined fire is greater. Long research into the properties of insulating materials has enabled the firm to make a radiant and fireback which are highly efficient. These factors render the V-Inclined an extremely economical fire. Other handsome models described in the list include the "Veronica," the "Viola," and the "Verbena," all of which are fitted with automatic ignition. The cover of the new list features two "Vitaglo" radiants linked up with the slogan "V-Inclined." The firm have also published a leaflet (No. 1009), illustrating surrounds in polished marble finish and made of cast-iron.

An Appointment.

Messrs. John E. Williams & Co., Ltd., Victoria Paint Works, Partington, Nr. Manchester, announce that they have appointed Mr. William R. Settle (late of Bradford Gas Department) their Representative for the districts of Yorkshire, South Wales, and South-West England.

"Calor" Gas for A.R.P. Shelters.

Owing to the possibility of damage to gas mains with consequent interruption of supply, "Calor" gas is being installed in increasing numbers of A.R.P. Decontamination Shelters throughout the country for use in conjunction with gas water heaters of various types. A ready supply of hot water is an important adjunct to this class of A.R.P. work, and Bristol is the latest centre to adopt "Calor" gas for the purpose.

Raising and Lowering Gear.

The new Factory Act provides that arrangements be made for drying workmen's clothes. For this purpose coathangers on racks are frequently adopted, the racks being lifted out of the way by means of winch and pulleys. When loaded with wet clothes, however, it will be readily appreciated that these racks are fairly heavy, and winches having a capacity up to 2½ cwt. have to be used. For such purposes the London Electric Firm, of South Croydon, manufacture winches, pulleys, and other accessories combining sets of raising and lowering gear; and they will be happy to answer enquiries on the subject.

Punched Card Accounting Technique.

As no Business Efficiency Exhibition is being held in London this year Powers-Samas Accounting Machines, Ltd., held a private exhibition from Oct. 17 to 21, at Powers-Samas House, to demonstrate the latest punched card accounting machines and technique.

A full range of Powers' machines were on view and in addition they also exhibited for the first time several new machines, including the remarkable Powers Multiplying Punch which multiplies directly in sterling without any form of conversion or the reduction of the multiplicand to pence. Their expert staff were available to discuss the application of the punched card system to any phase of business in which visitors were interested.

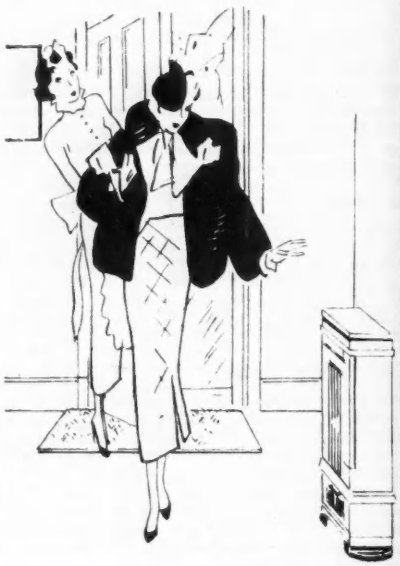
The "Climax" Circulator.

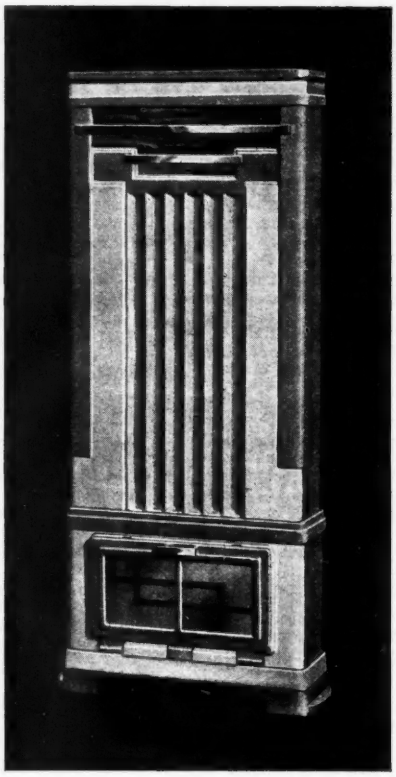
Having passed very rigorous tests, a new water heater has been placed on the market by the Climax Water Heater and Circulator Company, Ltd., West Wharf Road, Cardiff. This is called the "Climax," which is claimed to incorporate many novel features. It is of the storage type with a gas consumption of 27 cu.ft. per hour at 3 in. pressure. But what strikes one is its very compactness, the overall dimensions being 12 in. high by 6 in. square. The output of the heater is stated to be 13·2 gallons raised 90° F.

The water element is of 18 gauge copper throughout. All joints and seams are copper welded, and to obviate electrolytic action all brazing has been eliminated. The frame of the heater is of cast iron, which has been cadmium plated as a precaution against corrosion. "Staybrite" panels are secured to the frame, and to prevent heat losses these are lagged with a non-conducting material. All fittings are heavily chromium plated. The burners employed in the heater are Bray's No. 0 luminous, which are arranged in a battery of nine burners controlled by two taps in such a manner that either nine, six, or three burners can be lighted at one time. This is stated to be a great advantage where the heater is used with a prepayment meter as the consumer can arrange for rapid or slow heating according to his requirements. For ordinary domestic requirements, three burners will be found all that is necessary to maintain the supply of hot water that is needed. The whole nine burners need only be used to heat the water in the first instance or when hot water is required in a hurry, such as for a repetition of baths.

A thermostat is standard, and this can be set at any required temperature, and when that temperature is reached the gas rate is cut down to between 1½ and 2 cu.ft. per hour. A feature of this heater is the ease with which the burners may be cleaned. It can also be obtained in a form specially designed for building into walls.

The Ideal Gas Heater for





ENTRANCE HALLS
OFFICES · SHOPS
CORRIDORS
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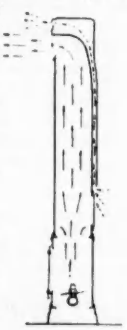
COMPACT, SMART AND ECONOMICAL

The VELOMAIN Heater is the best thing in Space Heating yet designed. In the first place, it needs no flue, the gas consumption being inside the limits for flueless heaters. Secondly, it is a most satisfactory heater, as it warms up quickly and circulates the air of a room 12×10×10 ft. over 2½ times each hour. As is fitting, its design is modern, and it is made in a variety of colour finishes, blending harmoniously with any scheme of decoration. Furthermore, thought has been given to upkeep. The design is simple and accessible for the little cleaning required, while the body is made from sheet steel, for long service, with cast-iron partswhere rigidity and strength are required.

TWO GREAT IMPROVEMENTS

Two very important developments have been achieved in the VELOMAIN Space Heater. The design ensures that the top and back do not become unpleasantly hot, while the heat is projected into the room at such an angle as to prevent discoloration of the walls or ceiling immediately behind or above the heater, thus obviating one of the greatest drawbacks found in the ordinary radiator of the past.

NOTE THESE UNIQUE PRINCIPLES



1. The large volume of pure air mixed with the heat stream issues horizontally from the Heater and so quickly warms the apartment.
2. The front body of the Heater is evenly warmed throughout its length.
3. The top and exterior back are kept cool by the constant stream of fresh air passing up the double back. Wall decorations are thus saved from damage by discoloration or deposit.
4. The amount of pure air drawn through the Heater ensures perfect combustion; prevents overheating and abolishes the necessity for any thermostatic device.

MAIN

VELOMAIN

SPACE HEATER

R. & A. MAIN LIMITED, LONDON AND FALKIRK

London Office and Showrooms: 48, Grosvenor Gardens, S.W.1. Glasgow Office and Showrooms: 82, Gordon Street

Reading Company Seek Powers for Additional Storage

Objections at Enquiry on Grounds of Danger

An Enquiry was held at Reading on Oct. 28 into an application by the Reading Gas Company for a Special Order empowering them to erect storage plant on land adjoining Park Lane, Tilehurst

The Inspector was Mr. R. L. Sich, and the Company was represented by Mr. H. Royston Askew, instructed by Blyth, Dutton, Hartley, & Blyth, Parliamentary Agents. Mr. J. A. Brain appeared for a Mr. Thomas Young Hay, who had given notice of objection on his own behalf and on behalf of other residents of Tilehurst, and for the Tilehurst Ratepayers' Association.

The plant is required to enable the Company to supplement the gas supply at peak periods. There had been objections by the Corporation on the score of amenities, but that had previously been satisfied by an amendment to the Order, and withdrawn.

In stating the case for the Company, Mr. ASKEW said the sole purpose of the Order was to authorize the Company to store gas at Tilehurst. Growth in demand for gas had made it increasingly difficult to maintain an adequate pressure at all times in the Tilehurst area. Gas was served to the western part of the Company's area by trunk mains, one going along the Oxford Road to Pangbourne and the other along the Bath Road to Theale. Tilehurst lay between the two and was supplied by branch mains from both of them.

On Sunday mornings, before the midday meal, they had a higher peak than at any other time. They had to be able to supply gas at an adequate pressure to meet that demand, which transcended the average demand by three and a half times. Up to a point it had been possible for the Company to meet the problem at Tilehurst by laying additional mains from the trunk mains on the north and south sides. The position had now been reached, however, when at peak times they could not take any more gas from the trunk mains for Tilehurst without robbing other areas supplied by these trunk mains. It was essential for them to take other steps, and there were only two courses open. They could either lay new mains from Reading or they could store gas at Tilehurst at off peak times for use at peak times. The laying of new mains from Reading would be a costly expedient, probably costing as much as £23,000. The cost of the storage system would be about £2,000. Recent developments had now made it possible to store gas in horizontal containers; this would satisfactorily meet the problem at Tilehurst.

In those circumstances the Company decided to seek a site at Tilehurst. Such a site had to satisfy five conditions: (1) It must be as near as possible to the centre of the trouble; (2) it must be convenient of access for the purposes of the Company; (3) it must be a suitable area for the purpose; (4) it must be a site in the market and for sale; (5) it must be free from building restrictions which would prevent the erection of a gas storage plant. The site applied for met all of these essential requirements, and, moreover, it was the only site which the Company could find which did.

Limitation of Height.

Mr. Askew said if powers were granted the Company would erect a small compressor house of good design and first-class material. The storage tanks would be 9 ft. 6 in. in diameter and 40 ft. long, and there would be two of them. The Company had accepted a limitation that the height of any gas container should not be more than 12 ft. 6 in. above the mean level of the land, and, as the land had a distinct slope, anyone standing in the road would look right over the top of the containers. They had also accepted an obligation to plant and maintain quick-growing shrubs all round the containers. Under such circumstances this plant could not be said to affect the amenities of the district. On the Company agreeing to amend the Order as indicated, the Reading Corporation had withdrawn their objections.

There had been apprehensions locally at the proposals, since the word "storage" probably conveyed to the ordinary mind the idea of a gasholder. But they were limited to quite a low construction, which must be surrounded by evergreen trees or shrubs, so that it seemed that the weight of the objections had been very much reduced. Mr. Hay had made something of the question of danger in his objections, but in the view of the Company the proposed containers were not likely to be any more dangerous than an ordinary gas main. If there was ever a war, it was the view of the Company that many things were much more dangerous than these containers, such as steam boilers, petrol tanks, and even the Reading Gas-Works themselves. Were they to have no gas-works because there might be a war?

Mr. *Douglas H. Helps*, Engineer and Manager to the Company for the last 36 years, supported Mr. Askew's statement. He said that the volume of gas stored at the Works was 8¼ million cu.ft., which was 430 times as much as that which they proposed to store at Tilehurst. The price of gas in Reading was 7·8d. per therm, which was very low—lower, in fact, than the price in London.

In reply to Mr. Brain, Mr. Helps stated that the main objection to the alternative method of laying new mains was the cost. He could say that there would also be other advantages for the compressor. It would be automatic, and if the pressure fell in the main below a predetermined point, it would automatically restore the position to that for which they had arranged in the main. This would not apply if, instead, they extended the mains, because the system would not be automatic. The question of renewing all their mains certainly did not arise at the present time.

In reply to further questions on the score of safety, Mr. Helps re-affirmed his opinion that danger from the containers would be quite negligible. There would certainly be some possibility of sinking them beneath the level of the ground, but he could conceive of no reason why this should render them any safer. There was no danger of explosion from gasholders under pressure. He would be quite satisfied to go to the top of any of their gasholders with a pickaxe, drive a hole, and light the gas. In fact, in his view, the danger would be greater if the containers *were* below ground. Questioned as to whether they could isolate their gas mains, Mr. Helps stated that they could not isolate the whole of them without shutting the gas off from the town.

Re-examined by Mr. Askew Mr. Helps explained that the Company was a statutory company. It could not store gas unless it obtained the approval of the Board of Trade. As regards finance, the Company was tied, and was told what it might do in this respect by Acts of Parliament. New mains would be a capital expenditure.

Ratepayers' Viewpoint.

Mr. *Thomas Hay* explained that he represented a large number of ratepayers in the vicinity of this proposed site. This site was built up on two sides, being thickly populated on the town side. He understood that the containers to be used were something different from the ordinary containers, with 60 lb. pressure per sq.in., which was quite a serious pressure to put into such a thing. He did not know of any other potential sources of danger in the neighbourhood as referred to by the Company. The only places with petrol tanks he knew of were one site with two tanks and another with three tanks, but in both cases the tanks were below the ground. So that in the immediate district he did not know of anything which would come under what had been referred to as potential dangers. He thought that there was plenty of land suitable for this purpose which was further away from dwelling-houses.

Mr. *Henry Heylin* said he was present as Chairman of the Tilehurst Ratepayers' Association, in which position he was conversant with the whole neighbourhood. It was in 1932 that his Association made a complaint about the pressure of gas at Tilehurst and this was remedied by the laying of new mains. He saw no reason at all why the same trouble now should not be remedied in the same way. As a local Air Raid Precaution warden, he looked upon the present proposal with some alarm, particularly as the council school was going to be converted into a hospital in a case of emergency.

Mr. BRAIN, in addressing the Inspector, said there was a strong feeling in the locality against these proposals, and it did seem to him that the case, as presented by the Company, resolved itself into one of expense *v.* danger. In these days of threatened crisis they were told that the prevention of panic was one of the essentials in preparing for an emergency. Here they were going to introduce a thing which, whether or not it was actually a danger—and he submitted that the evidence showed that it would be a danger—the people who had it almost in their back gardens would have the impression that it was dangerous. That was not going to conduce to an air of serenity among the civil population.

He submitted that Mr. Askew had inferred that there was some danger by trying to qualify it in saying that these storage tanks would not be so dangerous as a steam boiler. One might as well say they were not so dangerous as a stick of dynamite, for no one was proposing to put a steam engine or a stick of dynamite among the population there. The Company by saying there

were other numerous sources of potential danger admitted that there was some danger. Because they had eleven dangers in a certain place they were not entitled to introduce a twelfth. On the other hand, the Company had produced no evidence of other potential sources of danger in this neighbourhood. The ratepayers objected to the introduction of even one source of danger, however slight it might be, when the Company could go further afield and find other land that was not so surrounded with houses as this was.

He suggested that there was another alternative which the Company apparently had not considered, and that was the suggestion of burying these storage tanks. That, he thought, would go a very long way towards removing the objections of the ratepayers. In the case of an explosion they would then be less likely to have spread of the damage. To a large extent that would remove a good deal of the apprehension that would be felt by people when they saw these things, even though they were surrounded by beautiful shrubs and trees.

Mr. ASKEW remarked on what he described as the extraordinary absence of evidence on the part of the objectors. They had, he said, a petition with 91 signatures, yet not a single one of those signatories had come there to give evidence. The only point left in the case was the suggestion of danger, and that was nothing more than an apprehension which might exist in the minds of some people. Air raid precautions were the responsibility of the local authority. Not only had the local authority in Reading not objected and not been represented by their A.R.P. officer, but they had accepted the proposals.

This concluded the Enquiry.

The Stretford Coal Price Appeal

Hearing Before Committee of Investigation

The hearing of the complaint by the Stretford and District Gas Board against the prices sought to be charged on the renewal of contracts for washed slack was resumed on Nov. 5. The hearing began on Oct. 21, and the first day's proceedings were reported in the "JOURNAL" of Oct. 26, p. 285.

The members of the Committee present at the resumed hearing were Mr. Harold Rhodes (Chairman), Major A. J. Gainsford, Mr. J. Hall, and Mr. W. B. Woodhouse. Mr. H. Royston Askew again appeared for the Stretford Gas Board, and Mr. Jacques Abady, K.C., and Mr. Geoffrey Veale for the Executive Board of the Midland (Amalgamated) District Coal Mines Scheme.

Mr. *Leslie K. Reid*, Director of Messrs. Anderson & Son, Ltd., Stretford, said during 1937 his Company were using fuel oil for heating, the annual consumption being 250,000 gallons. The Stretford Gas Board offered them gas at 3d. per therm. Having regard to that price and the price of fuel oil, and taking into consideration the advantages of gas, that was an economic proposition to the Company, and they had taken gas, of which they used in the neighbourhood of 70 million cu.ft. per annum. Their contract contained a coal clause, so that if the price of coal went up the price of their gas went up. At present they were still operating under the price of 3d. per therm. If the price of gas was increased 0·2d. per therm, on the basis of a 1s. rise in the price of coal, it would be a proposition for his Company to revert to fuel oil.

Cross-examined by Mr. ABADY, witness said they had to regulate the heat they used. It was, if anything, slightly easier to regulate it by gas than by oil. Asked if that was not one of the reasons why they were induced to change, he said that they were induced because the Stretford proposition was saving them money. When they made the contract the price of fuel oil was 4¼d. per gallon; now, it was 3¾d. The drop in the price of oil had disadvantaged the position of gas.

Colonel *W. M. Carr*, Consulting Engineer to the Stretford Gas Board, produced carbonization books, in which assays of the coal were recorded; also the proximate analysis book, and a file showing the complaints that had been made as to moisture and ash content.

Mr. ABADY: Since when do you say there has been excessive moisture or inerts in the Yorkshire Main, Hickleton, or Denaby?

Witness: I do not say there has been excessive moisture or inerts in any of those coals. My evidence was to show the average relative moisture and inerts in those coals, which I compared with Hemsworth to show why I was prepared to pay more for Hemsworth coal.

Colonel *Carr* agreed that in the report of the Board for 1938 it was stated that "the fuel laboratory reports show that the qualities of coal supplied under contract have been well maintained." The same statement was made in the 1937 report. Asked why it did not appear in the 1938 report, he said he was not responsible for 1938. That report was submitted to the Board in June.

Mr. ABADY: It occurs to me as rather remarkable that there should be a paragraph about the Coal Selling Scheme, which is a sort of advance herald of the case that you have been putting here.

Major GAINSFORD said Colonel Carr had stressed the value of a particular coal to himself. The value of the coal "X" to him would not necessarily be the same as the value of that identical coal to some other works?

Colonel *Carr:* No.

Major GAINSFORD: Then do you suggest that this Scheme could possibly do its selling by basing its prices on the valuation made by individuals?—I thought the Scheme would base its prices in accordance with cost of production, not upon the ability of a consumer to pay.

Do you really think that in the past coal selling has been done on a basis of cost?—I don't know.

You know what the Coal Mines Act was brought in for—because it had been sold below cost in many instances, to you among others?—I don't agree.

Not when you paid 8s. 6d. for slack, not many years ago?—It depends upon the relative value of that grade of coal to other grades of coal at the pithead.

You agree with me that it is possible for two gas-works within 15 miles of each other to place coal "X" in one case at the top of a certain list of coals, and in another case to put it twelve or thirteen places down the list?—Different sizes of the same coal, perhaps, but the same washed smalls, no. The only person who can buy washed smalls for gas-works purposes is someone who is carbonizing in horizontal retorts.

Experience of Assaying Coals.

Mr. *Edward Crowther*, Chief Engineer and Manager of the United Kingdom Gas Corporation, Ltd., gave evidence as to his experience of purchasing and assaying gas coals. He had examined the records of the proximate analyses made during the last three years by the Stretford Gas Board of the coals concerned in the present enquiry, and of Hemsworth coal. The results of the tests showed a distinct superiority on the part of Hemsworth over the three coals complained of, as regards gas yield and coke yield, which was more than could be wholly accounted for by its lower ash and moisture contents. He was not surprised at this. He should anticipate a result of that order as between those four coals.

Asked by Mr. Abady why he had not set out his results in the way prescribed in the British Standard Specification, witness said he had not given a complete analysis because he was not endeavouring to give an absolute figure but merely relative figures. He was asked to examine the Stretford Gas Board's figures which they proposed to present at the enquiry, and to examine the record books from which they were derived, and to give his own parallel figures with theirs.

Mr. ABADY: Does not the specification provide for a separate test for total moisture upon coal which is received, upon a sample which is called the moisture sample, and are not the rest of the tests taken on air-dried coal, and are you therefore not enabled to get the total moisture calculated on the coal as received and also to state the moisture which is inherent?—That is possible, if this is followed out.

Is it not the direction?—Not if one is seeking to arrive at the gas yield of the coal as received. In order to do that, the obvious thing is to take a sample of coal as received, to weigh it out in that condition, and to carbonize it which is what is being done.

I am putting it to you that there is a standard method laid down for analyzing coal for inland purposes, and that you did not carry it out.—This specification does not deal with the assay of coal for gas making purposes.

In answer to Mr. WOODHOUSE, witness said he expected washed slack to contain considerably more moisture than the average run of mine coal. Asked what portion he would regard as inherent

or contained moisture, he said that was a difficult question, as the quantity varied from seam to seam. Taking these particular coals, he should say that a fair inherent moisture would be in the order of perhaps 2% or a shade higher; the remainder he should expect to find at the washery.

Asked by Major GAINSFORD if he had ever known a gas company willing to buy on the basis of pit analysis, witness said he thought it would be well for them to make their own check test. That would not be an imputation.

You say "No;" then why should you suggest that a colliery should sell on the basis of the buyer's analysis?—I think that is the reason why the buyer in this case asked an independent person to come and make a test of these coals.

These are laboratory tests?—So far as moisture and ash is concerned.

And they would vary very largely from tests made at the colliery?—Not necessarily.

When the Enquiry was resumed on Nov. 7, Mr. ASKEW remarked that at the previous sitting Colonel Carr was asked if there had been previous complaints to the Amalgamated Board, and he said "No." As a matter of fact, they had since been reminded that there was a complaint in May of this year.

Mr. *Hubert A. Marris,* Technical Assistant to the Stretford Gas Board, said that for the last nine months he had been in charge of the fuel laboratory tests, and described the method of taking them. When Colonel Carr was at the Stretford Board day by day, he thought the proximate analyses were entered up at the end of each week. Since that time, he believed they had been entered at rather longer intervals.

Asked by Mr. Abady why records of 1938 were succeeded by records of 1930, he said that was probably an error in writing. He thought it extremely probable that both tests had been made on the same day. The tests were made in accordance with the British Standard Specification, with the exception of moisture, for which they used their own standard test.

Mr. Abady called attention to some over-writings in figures of moisture for Hemsworth coal. Witness said he did not know when the alterations were made.

Mr. *Thomas H. Pardoe,* Industrial Engineer to the Stretford Gas Board since January, 1935, said when he entered the Board's employ, the sales of gas for industrial purposes were 1½ million therms a year, and the average price was 4·92d. In the year ended March, 1938, those sales had risen to 3½ million therms, and the average price was 3·7d. When he entered the Board's employ the price of fuel oil varied between 2·1d. and 2·6d. per therm, and was thus considerably cheaper than gas at that time. Of the total increase in the sale of industrial gas between 1935 and 1938, approximately 75% was in replacement or substitution for fuel oil. In most contracts, the price of gas had been raised under the coal clause, owing to the increase in the price of coal.

He was endeavouring to negotiate for a big supply of gas to a firm who would take 50 million cu.ft. per annum to start with. They used fuel oil to-day. They had asked if, assuming that they entered into a contract, they could be reasonably sure that the price would be 3d. per therm. The negotiations were held up pending the present application. He was also endeavouring to obtain a load from another firm, which would be about 50 million cu.ft., and there were other negotiations representing 80 or 90 million cu.ft. The question of whether the Board got them or not depended on the price of gas they could offer.

Replying to Mr. Abady, witness said the difference in the price charged to Taylor Bros. (3·413d.) and Anderson & Son (2·4d.) was represented by the difference in the load factor. Anderson's load was practically continuous, while Taylors' was not. In the cases of some new consumers he had designed special furnaces for them, and had tried to make them as watertight as possible for gas. Asked if it was through the use of those furnaces that he had secured a large part of the load, he replied that he would not say a large part—20%.

In answer to the Chairman, he said he felt that the Stretford Board was a good customer of the coal industry, and it would be in the interests of that industry to retain them. If they could capture the oil market for gas they would capture it to a certain extent for coal and the coal industry ought to consider that attitude.

Strenuous Opposition.

Mr. JACQUES ABADY, K.C., in opening the case for the Executive Board, said he was instructed to offer the most strenuous opposition to the application. He was going to make some severe comments on the way the case was lodged and had been presented, but he did not wish to make the slightest reflection direct or indirect on his old friend Colonel Carr, who had been put in the extraordinarily difficult position of having to give evidence in support of communications and statements for which he was not responsible. Far be it from him to suggest any lack of bona fides in anybody, but he did say that the complaint had been put forward with so many reckless statements, which had not been substantiated and were not capable of being substantiated, that he had wondered whether there was some ulterior motive behind it. He had searched for that motive, and he thought he had found it in Colonel Carr's evidence that, owing to the increased demand and the Board's forward industrial policy, they had had to incur annual expenses in connexion with an expenditure of approximately £290,000. He would couple that with Colonel Carr's contention that the undertaking, having regard to its special circumstances, was entitled to special consideration; that here was a field for using several thousand tons of coal, and he thought the collieries ought to co-operate with them in getting a reduced price so that they might capture it.

If that was Colonel Carr's case—that he had got a forward policy and had had an enormous increase, that he had had to enlarge his works and he wanted co-operation and special terms in order that he could go on with that policy and use his capital usefully—it was singularly unfortunate that that case had never been put to the Executive Board, or to anybody responsible for the conduct of the coal industry, before this twopenny-halfpenny complaint. Colonel Carr did not know what the reaction of the Executive Board would be to such a case.

The CHAIRMAN: You say your clients have not had a chance of considering that aspect of the case?

Mr. ABADY: It has never been put to us. I have no authority to say what their reaction would be, but it has never been put, and if that is the gravamen of Colonel Carr's case it is singularly unfortunate that, before trying to see what the reaction is, the Stretford Board bring this complaint, which I am going to show is most utterly unfounded. He went on to say that there were mistakes in the original statement of complaint, and that it had been put forward in a haphazard way. It was said that the Executive Board were acting unreasonably and against the public interest because they were charging the same prices for all fuels though of different values, and that, for the contracts that were in question, they had put their prices up, although Hemsworth, which it was alleged was a superior coal, had not been advanced in price. The Committee would be surprised to know that there was no renewal of a contract for Hemsworth coal at 22s. 7d. He understood that a contract had been entered into for 5,000 tons of Hemsworth or South Kirkby washed smalls, at the seller's option. He would show that the general price at which South Kirkby coal was sold was less than that of Hemsworth, and that it was not in the same class of fuel. He was instructed by the selling agents that the reason why that seller's option was insisted upon was that the Hemsworth Company were building new coke ovens, and anticipated that they would themselves want the use of Hemsworth smalls for coking in those ovens after Jan. 1, so that the portion of Hemsworth which could be supplied to Stretford would be that between September and January, thus the bulk of the contract would be South Kirkby.

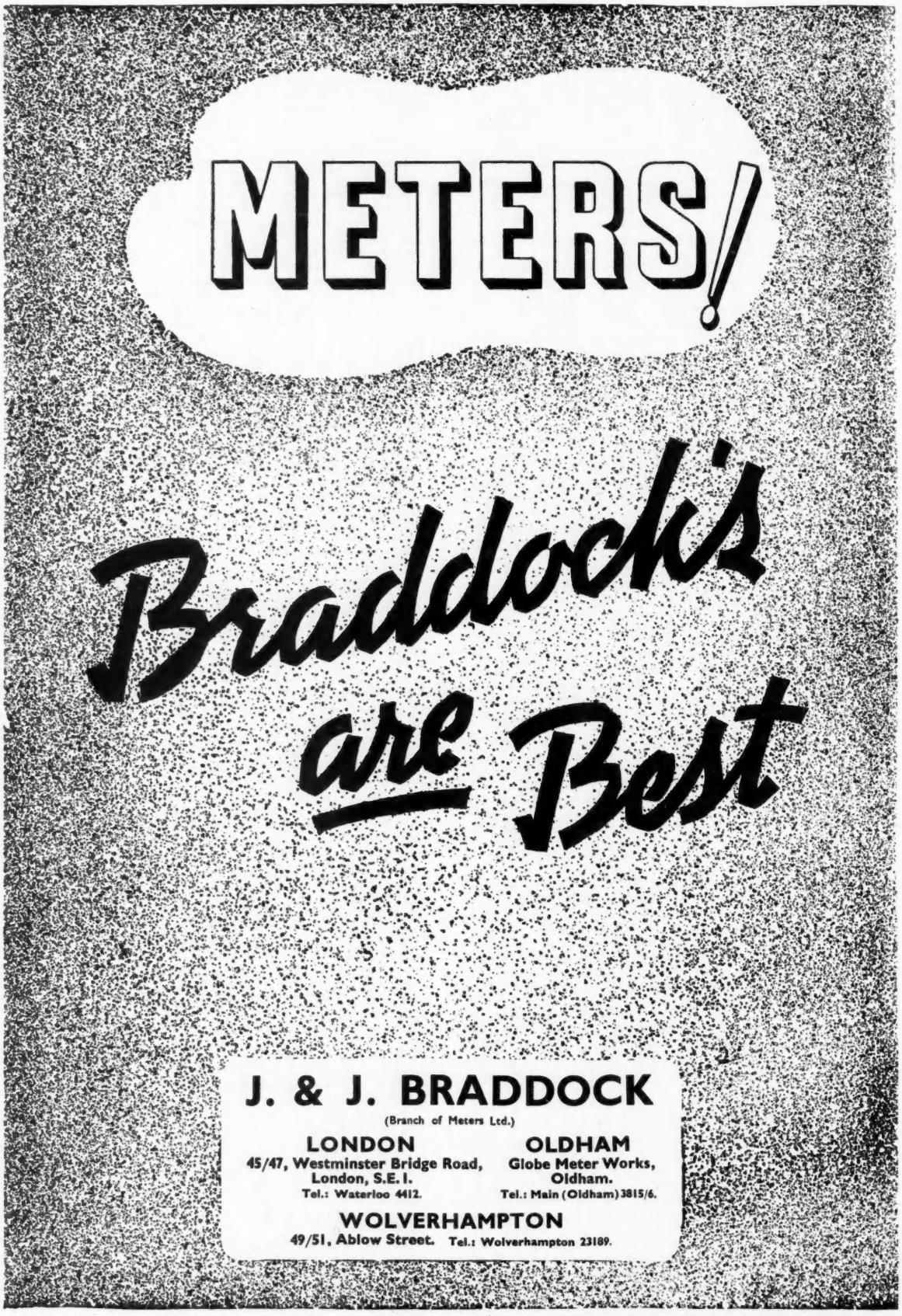
On the question that the fuels were of different value, he did not admit it, in so far as it was said that the test of value was the value to a consumer as determined in a plant which carbonized a thousandth part of a ton or determined half a hundredweight. That was not a practicable standard that they could apply to the evaluation of coal. The four coals were substantially of the same value, though there might be slight variations as between one delivery and another. It was not true to say that the prices of those coals fixed irrespective of value and merely because the coalowners had got what was alleged to be a monopoly. They were evaluated according to what might be summarized as their general reputation—the seams whence they came, and their intrinsic value as ascertained on the only comparable basis, the air-dried basis. Any difference was covered by 1%, or 1·9d. on the price which the coalowner got. It was impossible in business to go fiddling about with such minute differences. It was not possible to vary the price of fuels according to the method of carbonization.

Various figures of analysis had been put before the Committee, but it was admitted that none of them had been made in accordance with the British Standard Specifications. They had not had a single figure put before them on the air-dried basis, which was the only way they could compare one coal with another. They were intended to show that the gas yields per therm was very low. It was very strange, if the Gas Board had been using all these bad coals, that that was when "the fuel laboratory reports showed that the qualities of coal supplied under contract had been well maintained."

Under present contracts there was outstanding to the Stretford Gas Board at least 60,000 tons of coal at no increased price over last year.

He dealt with Mr. Crowther's evidence as to the analysis of the coal, and also with that of Colonel Carr, and asked that it should be rejected on the grounds that the samples were not taken properly as directed, that there was no separate estimation of moisture, and that there was not a single figure of the ash of the air-dried coal.

Dealing with Mr. Watson Smyth's evidence, Mr. Abady suggested that the possible effect of an increase in the price of gas was only 5d. or 6d. on a ton of steel tyres selling at £20. He went on to speak of the finances of the Stretford Board, and said that, in addition to having a surplus of £18,000 on the last year's working, they had increased the price to the industrial consumer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by ½d. per therm as from April 1, which would represent between £5,000 and £6,000. How, from the point of view of the means test, they could come to the Committee and say that they were not in a position to pay 1s. a ton more for some of the coals, irrespective of whether that was the proper market price, he did not know.

Mr. ASKEW referred to Mr. Abady's remarks as to discussions between the Executive Board and the Stretford Gas Board. He said his Board had always been willing to discuss the matter with the Executive Board and were so now, but they had never been approached by that body. He suggested that it might be better that the enquiry should be adjourned now for the purpose of discussion without prejudice. If they were able to effect some form of suitable collaboration, the matter would be disposed of.

The CHAIRMAN said the difficulty about that was that probably a fairly protracted time would be wanted for the negotiations. Whatever the decision of the Committee, he did not think it would militate against the parties discussing and coming to a satisfactory arrangement.

Mr. ABADY said he imagined the Executive Board would be glad to discuss the matter whatever decision the Committee came to, but he could not assent to an adjournment, and asked the Committee to come to a decision on the complaint as put forward.

Mr. *George Price*, Mining Engineer, and Adviser to the Executive Board on technical matters, said the three coals affected had been compared unfavourably by the complainants with Hemsworth ⅝ in. washed slack. He had prepared a table of analyses on the air-dried basis, in accordance with the terms of the British Standard Specifications, which he considered was the only way to get a true comparison. The free moisture content of a washed fuel at its delivery point did not necessarily coincide with the content at the colliery whence it was despatched. He should expect the amount at the point of delivery to be less.

Asked by Mr. Abady if, having regard to the analysis of the four coals, there was any substantial difference from a gas-making point of view, he said in his opinion they were very similar coals. Hemsworth was better than South Kirkby. Free moisture content depended to some extent on circumstances beyond the control of the colliery company, such as weather, time of standing, and so on, and in his opinion there was no real value to be drawn from comparative tests made on coal as received. There was nothing in the method of washing to account for the alleged differences in the amount of free moisture.

Mr. ASKEW remarked that the analyses of Denaby Main and Yorkshire Main coals, put in by the witness, were made nine years ago, and said they had heard in that room that coal seams changed over a period of years.

Witness replied that his experience was that, while conditions in one part of a pit might change, yet, if they got an average sample of the whole seam, there was very little change in the aggregate in, say, ten years.

Taking a particular coal, which before the Scheme came into operation was sold in different sizes, he agreed that those sizes were sold at different prices for gas-making.

Was not the reason this that, in fact, although they were all the same coal, and all washed, they were of different sizes, and therefore the amount of moisture remaining in them at a particular time varied, and that was really the top and bottom of the difference in value?—Yes, with this addition, that I should have expected the ash content in the smaller coals to be slightly higher than in the bigger.

Subject to that qualification, is it right that the analysis on an air-dried basis of the slack or, say, the double nuts would have been the same?—They would be substantially the same.

"Established Reputation."

Mr. *J. C. Armitage*, a Director of Selling Agency No. 2 (Doncaster Collieries Association Sales, Ltd.), said Yorkshire Main and Hickleton Main washed fuel were sold through that Agency. They were sold to other consumers than gas firms. He considered that the pit prices to Stretford (the figures showing which had been derived from delivered prices fixed by the appropriate committees) fair. The suggestion that the prices with which the complainants were concerned had been fixed without regard to the quality of the coals was not true, in his opinion. "Established reputation" was a very good way of assessing the value of fuels. It had been done in this case, and he should say in every other case. It was almost impossible, and quite impracticable, to assess the value of fuels from the point of view of the consumer. From what he had learned during the years he had been in the coal trade he should say that South Kirkby coal, generally speaking, for most purposes, was not classed as quite as good as Hemsworth. The general reputation of the four fuels mentioned in the case was extremely good. They were as good washed fuels as could be got in South Yorkshire.

Asked as to the difference between Hemsworth and Denaby he said that, until he came to that enquiry, he should have classed Denaby as being as good as Hemsworth. All his experience had been that it was quite as good.

Mr. ASKEW asked if the Executive Board had fixed a minimum price for every class of coal, as they were required to.

Witness: For every sale of coal, yes.

Witness did not admit that the policy of the Executive Board at present was in effect to make public utilities, through the price of coal, subsidize the sale of domestic coal. Asked if they were not raising the price of gas coals to the Stretford Board, he said they were trying to bring them up to the level that other people had been paying. The Board had fixed minimum prices in respect of coal sold to an excluded works.

Witness said Hemsworth coal usually obtained a higher price than South Kirkby. Asked whether it was right to make a contract for Hemsworth and South Kirkby at one price, he said he thought so, in the particular circumstances in which the contract was made.

Mr. ASKEW, in a closing address, said the Stretford Board had, with great endeavour, built up a large demand for gas for industrial purposes, and thereby created a large market for coal. Three contracts came up for renewal of coals on which they had already paid increases of no less than 65%. The prices of those contracts were admittedly fixed in boom conditions, and now they were asked to pay further increases in conditions which were certainly not boom conditions, and where there was a decreased demand for coal. The Executive Board had practically told the Gas Board that they disbelieved almost everything they had said. It had been suggested that they did not believe in the Board's industrial load, did not believe they got it from the fuel oil; they tried to tell the industrial witnesses that they knew their business better than the witnesses themselves, and that they did not place any reliance on the Board's analyses, and disregarded the fact that he had two of the best known gas engineers in England, who had been carbonizing coal for years.

Against the Public Interest.

The Gas Board had established that, with the increases they had already had to pay for fuel, the price at which they could sell industrial gas had now reached the critical point, at which it no longer had an advantage against oil at the price of fuel oil. It was quite clear that if there was any further increase it would lead to a loss both of the existing market and of the probability of extending that market. If that happened, it must take away an important market for coal which they had achieved, and let in imported fuel oil, which would be against the public interest. The price of coal under existing contracts had already risen substantially since the end of March, and must rise more as contracts ran out; coke had fallen substantially and looked like falling more, and tar had fallen 25%. The accounts for the year ended March, 1938, did not in the least represent the position of the Stretford Gas Board to-day. Mr. Abady had suggested that the real reason for the application was capital charges on the new plant the Board had constructed. There was nothing in that point. The capital charges would be slightly less for the year ending March, 1939, than for the previous year, owing to the increase in the sales of gas.

Mr. Askew went on to say that, in view of what the complainants had proved, the Executive Board ought not to succeed unless they proved that the proposed increases were necessary for colliery profits and that it was right that they should have those increases for colliery profits. They had failed to prove either of those things. There was nothing in the Coal Mines Act which even implied that the industry was always to raise prices when the demand went down and down. Any such policy must be suicidal as a matter of business.

He suggested that the alterations of price to the Gas Board looked very like a concerted move to raise the price of coal to gas undertakings so as to be able to charge a low price to the domestic market, and a domestic market which was in competition with them. If so, it was grossly unfair, but even if it were right he would still submit that the special circumstances of the Stretford Board ought to be considered. Dealing with the question of tests, he did not deny that on an air-dried basis they were different, but said that was irrelevant to the case, as they did not receive coal on that basis. There were differences in the gas-making values of the coals as received by them, and it was not right to seek to charge them a uniform price for goods that were different.

The CHAIRMAN said the Committee had some difficulty in arriving at a decision, and would consider the matter further and give their decision at a later date. He would not say anything as to what facts caused their difficulty. "We do express a hope," he added "that as, according to Mr. Abady's statement, the Executive Board would certainly be prepared to meet the wishes of the Stretford Gas Board if they were to come along and explain their difficulties with regard to the quality of the fuel, if they preferred to substitute some fuel for fuel that was not so satisfactory from their point of view, then there would probably be no difficulty in making some arrangement. If that could be done the Committee would be very glad to see it done, but in the meantime that is only an expression of opinion."

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Markets and Manufactures

Current Sales of Gas Products

The London Market

LONDON, *Nov.* 14.

There is little of interest to report in the London Tar Products market, to-day's prices being as follows:

Pitch, nominal at about 31s. per ton f.o.b.
Creosote 4½d. to 4¾d.
Refined tar, 3¾d.
Pure toluole, about 2s. 3d.
Pure benzole, about 1s. 9d.
95/160 solvent naphtha, 1s. 7d. to 1s. 8d.
90/160 pyridine, 10s.
All per gallon naked at makers' works.

The Provinces

Nov. 14.

Crude Gas-Works Tar, 15s. to 20s.

To avoid misunderstanding, it is necessary to state that the above price is not claimed to represent a market value. It is a price worked out from week to week upon a system which has been used for many years as a basis for the fixing of certain contracts for crude tar of varying qualities in different areas.

The average prices of gas-works products during the week were: Pitch—East Coast, 31s. to 32s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 31s. to 32s.* Toluole, naked, North 1s. 7½d. to 1s. 9d. Coal tar, crude naphtha, in bulk, North, 7¾d. to 8¼d. Solvent naphtha, naked, North, 1s. 4½d. to 1s. 5d. Heavy naphtha, North, 1s. 2½d. to 1s. 3d. Creosote, *ex* works, in bulk, North, liquid and salty, 4⅜d. to 4⅝d.; low gravity, 4¼d. to 4½d. Carbolic acid, 60's, 1s. 7d. to 1s. 10d. Naphthalene, £13 10s. to £16. Salts, 70s. to 75s., bags included. Anthracene, "A" quality, 4½d. to 4¾d. per minimum 40% purely nominal; "B" quality unsalable. Heavy oil: Unfiltered anthracene oil, min. gr. 1,080, 4¾d. to 4⅞d.; filtered anthracene oil, min. gr. 1,080 5¼d. to 5½d.; heavy tar oil, gr. less than 1,080, 4½d. to 4¾d.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Scotland

GLASGOW, *Nov.* 12.

Demand is still far from satisfactory and, in most cases, prices are easy.

Crude gas-works tar.—Actual value is about 37s. to 38s. per ton *ex* works in bulk.

Pitch is only in small request with quotations at round 22s. 6d. to 23s. 6d. per ton f.o.b. for export, and about 20s. to 22s. per ton in bulk for home trade.

Refined tar.—Makers' prices are unchanged at 3¾d. to 4d. per gallon in the home market and round 3d. per gallon for export both into buyers' packages at makers' works.

Creosote oil.—Market continues very slow and to-day's actual values are lower as follows: Specification oil, 4¼d. to 4½d. per gallon; low gravity, 5d. to 5¼d. per gallon; neutral oil, 4½d. to 4¾d. per gallon; all *ex* works in bulk.

Cresylic acid.—There is still very little new business being conducted and supplies can readily be secured at the following prices: Pale, 97/99%, 1s. 3d. to 1s. 4d. per gallon; dark, 97/99%, 1s. 1d. to 1s. 2d. per gallon; and pale, 99/100%, 1s. 5d. to 1s. 8d. per gallon; all according to quality, *ex* works in buyers' packages.

Crude naphtha is changing hands at 5¼d. to 6d. per gallon *ex* works in bulk, according to quality.

Solvent naphtha.—90/160 grade is offered at 1s. 3½d. to 1s. 4d. per gallon and 90/190 heavy naphtha at round 1s. 1d. to 1s. 1½d. per gallon.

Motor benzole is 1s. 3d. to 1s. 4d. per gallon.

Pyridine.—90/160 grade is 8s. to 9s. per gallon and 90/140 grade is 9s. to 10s. per gallon.

Benzole Prices

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole ..	0	9½	to	0	10	per gall. at works
Motor " ..	1	3	"	1	3½	" " "
90% " ..	1	4	"	1	4½	" " "
Pure " ..	1	8	"	1	8½	" " "

Contracts Advertised To-Day

Coal.
Iron Bridge and District Gas Company. [p. 590.]

Condensers.
St. Helens Gas Department. [p. 590.]

Detarrer.
St. Helens Gas Department. [p. 590.]

Plant Dismantling and Re-erection.
St. Helens Gas Department. [p. 590.]

Purifiers.
St. Helens Gas Department. [p. 590.]

Station Meters.
St. Helens Gas Department. [p. 590.]

Steel Mains, Valves, and Connexions.
St. Helens Gas Department. [p. 590.]

Water Storage Tank.
St. Helens Gas Department. [p. 590.]

Dividend Announcement

Montevideo Gas and Dry Dock.—The Directors of the Montevideo Gas and Dry Dock Company, Ltd., announce the payment on Dec. 1 next of a dividend of 3%, free of income-tax, on the ordinary capital of the Company, made up as follows: *Final.*—1½% balance in respect of the year 1937 (making with the interim dividend of 1½% paid on Dec. 1, 1937, and the partial final dividend of 3% paid on June 1, 1938, 6%, free of income-tax, for the year 1937) as declared at the General Meeting of Stockholders held on May 24, 1938. *Interim.*—1½% on account of the year ending Dec. 31, 1938, declared by the Board at their meeting held on Nov. 8, 1938.

Redditch Stock Issue

The Directors of the Redditch Gas Company are offering for sale by tender £20,000 of ordinary stock ranking for a standard dividend of 5% subject to sliding scale. The minimum price of issue is £120%, yielding at this price, on the basis of the 7% dividend declared for the last eleven years, £5 16s. 8d.%. Further details of this issue will be found in our advertisement columns.

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- **Leeds**
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- **Romford**
- **Slough**
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GAS STOCKS AND SHARES

Conditions on the Stock Exchange were more active last week than for some time past. Although the bulk of the business was distinctly selective, this brought forth a number of bright features which produced a general cheerfulness. The demand for British Funds was not quite so heavy as in the previous week and a few were easier at the close. It was satisfactory to note a firmer tendency in home rails, and several issues recorded fractional improvements. A large turnover took place in the Industrial section among iron, steel, and aviation shares, the latter being a particularly strong feature. Motor and brewery issues were also in demand, and more activity was noticeable in the shipping group. Oil and rubber shares remained almost neglected.

The Gas Market was comparatively well supported, and it will be seen in the lists that more price changes occurred last week. The majority of these were in an upward direction, and as an indication of a hardening tendency there is the improvement in Gas Light units. Imperial Continental turned the corner once more and several fixed interest stocks improved.

The report and accounts of the Oriental Gas Company for the year to June 30 last show that the Company's business continues to make satisfactory progress. Sales of gas increased by 3·83% (against 2·47%), and the net profit amounted to £43,289 compared with £35,898 for 1936-37. The Directors recommend the payment of a final dividend of 4½% free of tax, again making 8% free of tax for the year. It is interesting to note that the Company has distributed 8% per annum for the past 44 years, and tax free since the final for 1932-33. After allowing for the dividend, £128,020 is carried forward (against £108,731), or nearly 5½ times the amount required to pay the usual annual dividend.

Another dividend announcement last week was that of the Montevideo Gas and Dry Dock Company. The Directors have declared a dividend on the ordinary stock of 3%, tax free, which is made up as follows: 1½% balance for 1937, making 6% tax free for that year (against 4½% for 1936) and 1½% interim on account for 1938. The stock is now quoted at round about 76, at which price the yield works out at £10 17s. 8d.%.

Official Quotations on the London Stock Exchange

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Nov. 11.	Rise or Fall on Week.
1,767,439	Sept. 5	8	8	Alliance & Dublin Ord. ...	130—140	...
374,000	June 20	4	4	Do. 4 p.c. Deb. ...	95—100	...
734,733	Nov. 7	5	5	Ascd. Gas & Water U'd'ts Ord.	17/—19/-*	—/6
500,000	,,	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	19/—21/-*	...
444,389	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	19/—21/-*	...
296,523	,,	4	4	Do. 4 p.c. Irred. Cum. Pref.	16/—18/-*	...
500,000	Sept. 5	3½	3½	Do. 3½ p.c. Red. Deb. ...	93—98	...
560,070	Aug. 22	7	7	Barnet Ord. 7 p.c.	157—162	...
300,000	Oct. 10	1/9½	1/4½	Bombay, Ltd.	24/—26/-	...
180,435	Aug. 22	9½	9½	Bournemouth sliding scale ...	195—205	...
640,407	,,	7	7	Do. 7 p.c. max. ...	152—162	...
495,960	,,	6	6	Do. 6 p.c. Pref. ...	130—135	...
50,000	June 20	3	3	Do. 3 p.c. Deb. ...	75—80	...
312,025	,,	4	4	Do. 4 p.c. Deb. ...	97—102	+2
335,000	,,	5	5	Do. 5 p.c. Deb. ...	115—120	...
357,900	Aug. 8	7½	7½	Brighton, &c., 6 p.c. Con. ...	142—147	...
659,955	,,	6½	6½	Do. 5 p.c. Con. ...	126—131	...
205,500	,,	6	6	Do. 6 p.c. 'B' Pref.	120—125	...
855,000	Sept. 19	8	7	British Ord.	135—140	...
100,000	June 3	7	7	Do. 7 p.c. Pref.	140—145	...
350,000	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115	...
120,000	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...
450,000	,,	5	5	Do. 5 p.c. Red. Deb. ...	100—105	...
450,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95	...
100,000	22 May'33	6	4	Cape Town, Ltd.	1—2	...
100,000	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1½—3½	...
150,000	June 20	4½	4½	Do. 4½ p.c. Deb. ...	60—70	...
626,860	July 18	6	6	Cardiff Con. Ord.	118—123	...
237,260	June 3	5	5	Do. 5 p.c. Red. Deb.	105—110	...
98,936	Sept. 19	2/-	2/-	Colombo Ord....	1½—1¾	...
24,510	,,	1/4½	1/4½	Do. 7 p.c. Pref.... ...	22/6—24/6	...
739,453	Oct. 10	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	16/—18/-	...
296,144	,,	1/3·30	1/3·30	Do. 8 p.c. Pref. ...	22/6—24/6	...
1,775,005	Aug. 8	5	5	Commercial Ord.	78—83	...
140,000	,,	—	§13/4	Do. 4 p.c. Red. Pref.	95—100	...
620,000	June 3	3	3	Do. 3 p.c. Deb. ...	70—75	...
286,344	Aug. 22	5	5	Do. 5 p.c. Deb. ...	113—118	...
200,000	,,	—	§30/2	Do. 3½ p.c. Red. Deb.	97—102	...
807,560	Aug. 8	7	7	Croydon sliding scale ...	136—141	+1
644,590	,,	5	5	Do. max. div. ...	100—105	...
620,385	June 20	5	5	Do. 5 p.c. Deb. ...	113—118	...
239,000	Aug. 8	5	5	East Hull Ord. 5 p.c. ...	95—100	...
186,155	Aug. 8	6	6	East Surrey Ord. 5 p.c. ...	116—121	...
176,211	June 3	5	5	Do. 5 p.c. Deb. ...	112—117	...
250,000	Nov. 7	8	4	Gas Consolidation Ord. 'B'...	19/—21/-	...
250,000	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	17/6—19/6	...
9,223,324	Aug. 8	5⅜	5⅜	Gas Light & Coke Crd. ...	22·—23/-a	+-/6
2,600,000	,,	3½	3½	Do. 3½ p.c. max. ...	78—81	...
4,477,106	,,	4	4	Do. 4 p.c. Con. Pref....	97—100	...
2,993,000	July 4	—	3½	Do. 3½ p.c. Red. Pref. ...	98—101	...
8,602,497	May 23	3	3	Do. 3 p.c. Con. Deb....	77—81	+1½
3,642,770	,,	5	5	Do. 5 p.c. Red. Deb. ...	110—115	...
3,500,000	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	109—112	...
700,000	Sept. 5	3½	3½	Do. 3½ p.c. Red. Deb. ...	93—98	...
270,466	Aug. 22	6	6	Harrogate New Cons. ...	117—122	...
157,500	Mar. 21	1/2½	‡1/-	Hong Kong and China Ord. ...	1—1	...
213,200	Aug. 8	6	5½	Hornsey Con. 3½ p.c ...	97—102	...
5,600,000	Oct. 24	12	8	Imperial Continental Cap ...	108—113	+1
223,130	July 18	3½	3½	Do. 3½ p.c. Red. Deb. ...	87—92	...
235,242	Aug. 8	8½	8½	Lea Bridge 5 p.c. Ord. ...	162—167	−2
11,751	Aug. 22	10	8	Maidstone 5 p.c. Cap. ...	175—185	...
63,480	June 20	3	3	Do. 3 p.c. Deb.... ...	70—75	...
45,000	May 23	†10	†10	Malta & Mediterranean ...	130—135	...
				Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	100—105	+4
392,000	Oct. 3	5½	5½	M.S. Utility 'C' Cons. ...	99—104	...
231,977	Aug. 22	5	5	Do. 4 p.c. Cons. Pref.	95—100	...
968,658	,,	4	4	M.S. Utility 4 p.c. Deb. ...	95—100	...
390,076	June 20	4	4	Do. 5 p.c. Deb. ...	113—118	...
148,955	,,	5	5	Do. 3½ p.c. Red. Bds.	95—98	...
125,000	July 1	3½	3½	Montevideo, Ltd.	73—78	...
675,000	May 9	†6	†6	North Middlesex 6 p.c. Con.	142—147	...
250,000	Aug. 8	7½	7½	Northampton 5 p.c. max. *...	105—110	...
396,160	Aug. 8	5	5	Oriental, Ltd.	145—150*	...
300,000	Oct. 24	†7	†9	Plymouth & Stonehouse 5 p.c.	140—150	...
468,537	June 3	8	8	Portsmouth & Gosport Cons.	157—162	...
621,667	Aug. 8	8½	8½	Do. 5 p.c. max. ...	100—105	...
241,446	,,	5	5	Do. 5 p.c. Pref. ...	107—112	...
73,350	,,	5	5	Do. 4 p.c. Pref. ...	90—95	...
75,000	,,	4	4	Preston 5 p.c. Pref.	105—110	...
114,000	Aug. 8	5	5	Primitiva 4 p.c. Cons. Deb. ...	98—103	...
247,966	June 3	4	4	Do. 4 p.c. Red. Deb. ...	94—99	...
625,959	July 18	4	4	San Paulo 6 p.c. Cum. Pref. ...	8½—9	...
15,000	Sept. 5	6	6	Severn Val. Gas Cor. Ld. Ord.	20/6—22/6	...
441,275	Sept. 19	1/1½	1/1½	,, ,, 4½ p.c. Cum. Pref.	19/6—21/6	...
460,810	Sept. 19	-/10⅜	-/10⅜	Shrewsbury 5 p.c. Ord. ...	127—132	...
133,201	Aug. 22	5	8½	South African Ord.	4½—5½	...
9,000	June 3	4	‡4	South East'n Gas Cn. Ld. Ord.	21/—23/-	...
1,371,752	Aug. 22	1/2⅜	1/2⅜	Do. 4½ p.c. Red. Cum. Pref.	19/—21/-	...
871,636	,,	-/10⅜	-/10⅜	Do. 4 p.c. Cum. Pref. ...	18/—20/-	...
498,818	,,	4	4	Do 4 p.c. Deb.	99—102	...
450,000	Aug. 8	4	4	Do. 3½ p.c. Red. Deb. ...	94—97	...
150,000	,,	3½	3½	South Met. Ord.	103—106	...
6,709,895	Aug. 8	6	5	Do. 6 p.c. Irred. Pref. ...	125—130	...
1,135,812	,,	6	6	Do. 4 p.c. Irred. Pref. ...	95—100	...
850,000	,,	4	4	Do. 3 p.c. Deb.	75—80	...
1,895,445	June 20	3	3	Do. 5 p.c. Red. Deb. ...	107—112	...
1,000,000	July 4	5	5	Do. 3½ p.c. Red. Deb. ...	97—102	...
600,000	,,	—	§31/-	South Suburban Ord. 5 p.c. ...	113—118	...
1,543,795	Aug. 8	6	6	Do. 5 p.c. Pref.... ...	108—113	...
512,825	,,	5	5	Do. 4 p.c. Pref.... ...	95—100	...
500,000	,,	4	4	Do. 3½ p.c. Red. Pref. ...	90—95	...
250,000	,,	3½	3½	Do. 5 p.c. Deb.	113—118	...
888,587	June 3	5	5	Do. 4 p.c. Deb.... ...	95—100	...
250,000	,,	4	4	Do. 3½ p.c. Red. Deb. ...	94—99	...
200,000	Aug. 8	3½	3½	S. Western Gas & Water Ord.	16/—18/-	...
427,859	Sept. 19	8½	9⅜	Do. 4½ p.c. Red. Cum. Pf.	19/—21/-	...
160,523	Oct. 10	-/10½	-/10½	Do. 4 p.c. Red. Deb. ...	95—100	...
110,000	June 3	4	4	Southampton Ord. 5 p.c. ...	105—110	...
750,541	Aug. 8	5½	5	Do. 4 p.c. Deb.	95—100	...
148,836	June 3	4	4	Swansea 5½ p.c. Red. Pref. ...	105—110	...
350,000	Aug. 8	5½	5½	Do. 3½ p.c. Red. Deb. ...	93—98	...
200,000	June 3	3½	3½	Tottenham and District Ord.	125—130	...
1,076,490	Aug. 8	6⅜	6⅜	Do. 5½ p.c. Pref. ...	116—121	...
409,835	,,	5½	5½	Do. 5 p.c Pref. ...	108—113	...
62,235	,,	5	5	Do. 4 p.c. Deb. ...	95—100	...
334,615	June 3	4	4	Tuscan 6 p.c. Red. Deb. ...	95—101	...
85,701	Apl. 25	6	6	U. Kingdom Gas Cor. Ord. ...	17/6—19/6	...
1,131,550	Aug. 22	6	4	Do. 4½ p.c. 1st Cum. Pref.	19/—21/-	...
1,051,280	Nov. 7	4½	4½	Do. 4 p.c. 1st Red. Cum. Pf.	19/—21/-	...
762,241	,,	4	4	Do. 4½ p.c. 2nd Non-Cum.Pf.	16/—18/-	...
745,263	June 3	4½	4½	Do. 3½ p.c. Red. Deb. ...	95—98	...
1,066,186	Sept. 5	3½	3½	Uxbridge, &c., 5 p.c. ...	125—130	...
375,689	Aug. 8	7	7	Do. 5 p.c. Pref. ...	108—113	...
133,010	,,	5	5	Wandsworth Consolidated ...	135—140	...
1,371,138	Aug. 8	7	7	Do. 4 p.c. Pref. ...	95—100	...
2,525,768	,,	4	4	Do. 5 p.c. Deb. ...	113—118	...
1,343,964	June 3	5	5	Do. 4 p.c. Deb. ...	95—100	...
383,745	,,	4	4	Do. 3½ p.c. Red Deb.	97—102	...
400,000	,,	—	§25/-	Watford and St. Albans Ord.	128—133	...
558,342	Aug.	7	6⅞	Do. 5 p.c. Pref. ...	107—112	...
200,000	,,	5	5	Do. 5½ p.c. Pref. ...	110—115	...
200,000	,,	5½	5½	Do. 4 p.c. Red. Pref.	95—100	...
200,000	,,	—	16/8§	Do. 4 p.c. Red. Deb.	96—101	...
200,000	June 3	4	4	Do. 3½ p.c. Red. Deb.	92—97	+2
200,000	,,	3½	3½			

a.—The quotation is per £1 of stock. * Ex. div. † Paid free of income-tax. ‡ For year. § Actual.

Supplementary List and Provincial Exchanges overleaf.

STOCK AND SHARE LIST—Cont.

Supplementary List, not Officially Quoted, London

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Nominal Quotations Nov. 11.	Rise or Fall on Week.
202,152	Sept. 5	5	5	Ascot Ord.	101—106	...
128,182	July 18	5	5	Do. 5 p.c. Pref.	108—113	...
31,035	Aug. 22	–/4½	–/4½	Associated Utilities 4 p.c. Pref.	16/—18/–	...
100,000	Dec. 13	...	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...
17,000	Aug. 22	8	8	Bognor Orig. Ord. 'A' ...	155—165	...
62,210	,,	8	8	Do. New Addl. 'A' ...	155—165	...
87,160	,,	7	7	Do. New 7 p.c. max. ...	145—155	...
37,440	Aug. 8	10	10	Cam. Univ. & Town 10 p.c. max.	188—198	...
125,970	,,	7	7	Do. 7 p.c. max.	133—138	...
39,025	,,	5	5	Do. 5 p.c. max.	97—102	...
96,410	July 18	4½	4½	Cardiff 4½ p.c. Pref.	95—100	...
150,000	Aug. 8	4	4	Croydon 4 p.c. Pref.	97—100	...
130,000	June 20	4	4	Do. 4 p.c. Deb.	95—100	...
65,000	Aug. 8	8½	7½	Eastbourne 'A' 5 p.c. ...	140—145	...
198,000	,,	7	6	Do. 'B' 3½ p.c.	114—119	...
112,312	,,	5	5	Do. 5 p.c. Pref.	107—112	...
130,000	June 20	5	5	Do. 5 p.c. Deb.	112—117	...
24,000	Aug. 8	8½	8½	Great Yarmouth 8½ p.c. max.	43—48	...
59,400	,,	7½	7½	Do. 7½ p.c. max.	33—38	...
51,160	June 3	5½	5½	Do. 5½ p.c. Deb.	121—126	...
152,600	Sept. 5	9	8	Guildford Cons.	163—168	...
54,055	,,	5	5	Do. 5 p.c. Pref.	107—112	...
68,250	June 3	5	5	Do. 5 p.c. Deb.	107—112	...
156,600	Aug. 22	7½	7½	Hampton Court Cons. ...	131—136	...
80,000	Aug. 8	4	4	Lea Bridge 4 p.c. Pref. ...	90—95	...
60,000	,,	6	6	Do. 6 p.c. Pref.	121—126	...
94,876	June 3	4	4	Do. 4 p.c. Deb.	95—100	...
73,620	Sept. 5	8½	8½	Luton Cons. 'A'	153—163	...
107,960	Sept. 19	5½	4	Mid Kent Ord.	8¼—9¼	...
230,940	Aug. 8	10	10	Oxford & District Ord. ...	195—200	...
47,112	,,	5	5	Do. 5 p.c. Pref.	106—111	...
50,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	107—112	...
126,193	Nov. 7	7½	7½	Peterborough Ord.	137—142	–½
64,990	Sept. 5	6½	7½	Redditch Ord....	118—128	...
166,850	Aug. 8	8	8	Romford Ord....	142—147	...
60,000	,,	4	4	Do. 4 p.c. Pref.	97—100	...
44,000	Sept. 19	5	5	Do. 5 p.c. Deb.	112—117	...
25,570	Aug. 8	5½	5½	Rugby 5½ p.c. Pref.	120—125	...
25,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	104—109	...
42,750	June 3	5½	5½	Do. 5½ p.c. Deb.	118—123	...
110,950	Aug. 22	8	8	Ryde Ord.	140—150	...
270,086	Sept. 5	7	7	Slough Ord.	128—133	...
21,000	June 20	5	5	Do. 5 p.c. Deb.	110—115	...
28,872	Nov. 7	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	19/—21/–*	...
28,866	Sept. 5	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	18/—20/–	...
117,228	Aug. 8	7	5	Swindon Cons.	102—107	...
60,425	June 3	5	5	Do. 5 p.c. Deb.	112—117	...
64,380	June 3	5	5	Torquay & Paignton 5 p.c. Pref.	107—112	...
130,000	Aug. 8	8	5	Wakefield Ord.	116—121	...
81,650	,,	5	5	Do. 5 p.c. max.	100—105	...
82,000	Aug. 8	6	6	Weymouth Ord.	103—108	...
98,384	Aug. 22	6	6	Wolverhampton 6 p.c. Pref.	118—123	...
160,000	June 20	5½	5½	Do. 5½ p.c. Rd. Db.	105—110	...
90,000	June 20	5	5	York 5 p.c. Red. Deb. ...	104—109	...
133,640	July 18	6½	6½	Yorktown (Cam.) 5 p.c. Cons.	118—123	...
120,000	,,	5	5	Do. 5 p.c. Pref.	105—110	...
35,000	June 3	5½	5½	Do. 5½ p.c. Deb.	120—125	...

BRISTOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Nov. 11.	Rise or Fall on Week.
347,756	July 18	6	5	Bath Cons.	117—119	...
1,667,250	July 18	5	5	Bristol, 5 p.c. max.	112½—114½	...
120,420	June 3	4	4	Do. 1st 4 p.c. Deb. ...	100—102	...
217,870	,,	4	4	Do. 2nd 4 p.c. Deb. ...	100—102	...
328,790	,,	5	5	Do. 5 p.c. Deb.	119—122	...
274,000	Aug. 8	5	5	Newport (Mon). 5 p.c. max....	97—99	...
13,200	Sept. 19	8⅔	7	Pontyp'l Gas & W. 10 p.c. 'A'	12½—13½	...
13,600	,,	6	5	Do. 7 p.c. 'B'	11½—12½	...
40,000	,,	6	5	Do. 7 p.c. 'C'	11½—12½	...
140,778	Aug. 8	5	5	Weston-super-Mare Cons. ...	108—110	...
64,338	June 20	4	4	Do. 4 p.c. Deb.	100—102	...
33,340	,,	7½	7½	Do. 7½ p.c. Deb.	151—154	...

LIVERPOOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Nov. 11.	Rise or Fall on Week.
157,150	Aug. 8	6½	5	Chester 5 p.c. Ord.	109—111	...
92,500	June 20	4	4	Do. 4 p.c. Pref.	95—99	...
36,430	,,	3½	3½	Do. 3½ p.c. Deb.	87—90	...
41,890	,,	4	4	Do. 4 p.c. Red. Deb. ...	97—101	...
2,167,410	Aug. 22	6	6	Liverpool 5 p.c. Ord.... ...	121—123	...
245,500	June 20	5	5	Do. 5 p.c. Red. Pref. ...	100—105	+3
306,083	July 18	4	4	Do. 4 p.c. Deb.... ...	100—102	...
106,280	Aug. 8	10	10	Preston 'A' 10 p.c.	198—208	...
188,219	,,	7	7	Do. 'B' 7 p.c.	131—141	...

NEWCASTLE EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Nov. 11.	Rise or Fall on Week.
122,577	Aug. 8	8	8	Blyth 5 p.c. Ord.	161—163	...
732,000	Aug. 22	5	5	Hartlepool G. & W. Cn. & New	89½—90½	...
2,061,315	Aug. 8	5⅔	5	Newcastle & Gateshead Con.	22/9-22/3d	+/6
682,856	,,	4	4	Do. 4 p.c. Pref. ...	99—100	...
776,706	June 20	3½	3½	Do. 3½ p.c. Deb. ...	88½—89½	...
277,285	Oct. 24	5	5	Do. 5 p.c. Deb. '43 ...	103½—105½*	...
332,351	Aug. 22	6	6	Sunderland 6 p.c. max. ...	135—136	...

NOTTINGHAM EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Nov. 11.	Rise or Fall on Week.
542,270	Aug. 8	9	6	Derby Con.	133—138	...
55,000	June 3	4	4	Do. 4 p.c. Deb.	100—105	...
20,000	June 20	5	5	Long Eaton 5 p.c. Pref. ...	10—12	...
80,000	,,	5	5	Do. 5 p.c. Deb. ...	105—110	...

SHEFFIELD EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Nov. 11.	Rise or Fall on Week.
10,000	Aug. 8	10	10	Great Grimsby 'A' Ord. ...	205—215	...
6,500	,,	10	10	Do. 'B' Ord. ...	205—215	...
79,000	,,	10	10	Do. 'C' Ord. ...	195—205	...
1,806,339	Aug. 22	6½	6½	Sheffield Cons.	140—142	...
95,000	July 4	4	4	Do. 4 p.c. Deb.	101—103	...

d The quotation is per £1 of Stock. * Ex div.

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